



U.S. Department  
of Transportation  
Federal Aviation  
Administration

**REFERENCE**

# Rotorcraft Master Plan

2

AD-A221 178

DTIC  
ELECTE  
MAY 03 1990  
CS B D



~~DOT LIBRARY~~  
~~10A TECH REPORT UNIT~~  
~~300 INDEPENDENCE AVE SW~~  
~~WASHINGTON, DC 20591~~

Washington, DC 20591

September 1987

Associate Administrator  
for Aviation Standards  
Office of Airworthiness

FAA-P-8100.1

AWS-1 0989

**DISTRIBUTION STATEMENT A**

Approved for public release  
Distribution Unlimited

87 0472

# ROTORCRAFT MASTER PLAN

## FOREWORD

The Federal Aviation Administration developed the Rotorcraft Master Plan to contribute to a climate in which industry can continue to expand and realize the full potential of rotorcraft in meeting the nation's transportation needs. This plan addresses all aspects of rotorcraft requirements through the year 2000 in the areas of certification, heliports, and the National Airspace System (NAS). It is designed to interface with the NAS Plan and other planning documents that will guide agency actions for the remainder of the 20th century.

The Associate Administrator for Aviation Standards was assigned responsibility for originating and managing the Rotorcraft Master Plan in view of some key rotorcraft programs, expertise, and resources available in this area. Now that these programs are underway, the Rotorcraft Master Plan is essentially a long-range planning and integrating effort.

Therefore, effective with the issuance with this 1987 update of the Rotorcraft Master Plan, the Associate Administrator for Policy and International Aviation is responsible for management, coordination, and oversight of the plan.

Accession For	
NTIS GRA&I	<input checked="checked" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By <i>per Form 50</i>	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
<i>A-1</i>	

## TABLE OF CONTENTS

	<u>PAGE</u>
EXECUTIVE SUMMARY.....	1
CHAPTER 1 OVERVIEW AND ILLUSTRATIONS	
A. OVERVIEW	
- Introduction.....	1
- Background.....	2
- Goals.....	2
- Assumptions.....	3
- Synopsis and Structure of this Plan.....	5
B. ILLUSTRATIONS	
- Figure 1 U.S. Data 1985.....	8
- Figure 2 Helicopter Operator and Helicopter Distribution by Primary Mission.....	9
- Figure 3 Helicopter Landing Sites Concentration.....	10
- Figure 4 Estimated Industry Growth--Active Small and Medium Helicopters.....	11
- Figure 5 Fuel Use.....	12
- Figure 6 Estimated Active General Aviation Aircraft by Type of Aircraft.....	13
- Figure 7 Flight Hours Forecast.....	14
- Figure 8 Instrument-Rated Pilots.....	15
- Figure 9 Master Plan Functions.....	16
- Figure 10 Where We Are--Where We're Going.....	17
- Figure 11 Evolution Targets.....	18
- Figure 12 Plan Symbology.....	19
Plan Symbology (Continued).....	
- Figure 13 National Airspace System.....	21
- Figure 14 Composite Coverage--VOR Coverage at 8000 Feet AGL.....	22
- Figure 15 Composite Coverage--VOR Coverage at 1000 Feet AGL.....	23
- Figure 16 Heliports.....	24
- Figure 17 FAA/Industry National Prototype Heliport Demonstration and Development Program.....	25
- Figure 18 Certification.....	26
CHAPTER 2 AIR TRAFFIC PROGRAMS.....	27
CHAPTER 3 AVIATION STANDARDS PROGRAMS.....	48
CHAPTER 4 ROTORCRAFT CERTIFICATION DIRECTORATE PROGRAMS.....	82
CHAPTER 5 AIRPORTS PROGRAMS.....	104
CHAPTER 6 POLICY AND INTERNATIONAL PROGRAMS.....	121
CHAPTER 7 DEVELOPMENT AND LOGISTICS PROGRAMS.....	136

## **EXECUTIVE SUMMARY**

## EXECUTIVE SUMMARY

Rotorcraft are unique in operating capability and system requirements. Special attention must be given to the development and implementation of rotorcraft procedures, operating sites, and the certification process. In the past decade, the use of the helicopter has increased significantly. Although in recent years, there has been a considerable slowing of this growth with the overall decline of the economy. Demand for the unique capabilities offered by rotorcraft in both traditional and new roles has been spurred by improvements in productivity, design, materials, reliability, engines, and instrument flight rules (IFR) capability.

The Federal Aviation Administration (FAA) can help provide a climate in which industry can continue to expand and realize the full potential of rotorcraft in meeting the nation's transportation needs. Toward this end, the Rotorcraft Master Plan has been developed for long-term action over the next 2 decades.

The goals of this plan are to enhance the National Airspace System (NAS) to permit rotorcraft to employ their unique capabilities to the maximum extent, to provide for an adequate system of visual flight rules/instrument flight rules (VFR/IFR) heliports, and to improve safety by upgrading criteria and applying advanced technology.

Some of the significant events that have occurred toward realizing these goals since publication of the last Rotorcraft Master Plan include:

1. Rotorcraft Regulatory Review No. 5 (Operations and Maintenance) final rule was published in the Federal Register on November 7, 1986, with an effective date of January 6, 1987.
2. Issued an Instrument Flight notice of proposed rulemaking (NPRM) proposing a method of reduction of approved instrument approach speed. A public meeting was held in March 1987 to discuss the proposal.
3. A public meeting with participation of domestic and foreign manufacturers and foreign airworthiness authorities was held April 30 through May 2, 1986, to discuss the 92 European Airworthiness Authorities Steering Committee (AASC) proposals for Part 29 of the Federal Aviation Regulations (FAR). The consensus of the meeting was that 22 of the proposals have merit for publication as NPRM's. The four projects by specialty area have been combined into one NPRM, including all 22 proposals. Also, it was agreed that 16 of the AASC proposals would be best handled as changes or additions to Advisory Circular 29-2, Certification of Transportation Category Rotorcraft.
4. Awarded a contract (5-year period of performance, with a \$5 million ceiling) for support of the helicopter program over the full range of the development and logistics (ADL) portion of the Rotorcraft Master Plan.

5. The National Concept Development Heliport at the FAA Technical Center in Atlantic City, New Jersey, was dedicated on June 12, 1987. New technologies in heliport approach aids, procedures, communications, and lighting will be evaluated there and at the National Prototype Demonstration Heliports.

Special needs for rotorcraft are described in projects throughout this plan. Programs identified are specifically directed to rotorcraft, but an attempt is also made to identify other agency efforts which could either have an impact on rotorcraft or provide a benefit. The fixed-wing segment of the industry will benefit from improvements provided for rotorcraft. IFR reliever heliports and supporting routes will serve to increase system capacities. Major carrier and regional carrier industries are very likely to benefit from growing rotorcraft operations, similar to the way major carrier business has been enhanced by the growth of fixed-wing hub commuters and air taxis. The advantage of using a helicopter is, of course, its ability to operate into the very heart of an urban area.

Particular attention is focused on efforts to allow increased capability for safe rotorcraft operations in adverse weather conditions. For example, this plan contains projects dealing with research and certification of rotorcraft in IFR, icing, and snow conditions, as well as improved weather information, enhanced NAS capability for IFR operation, and development of IFR heliport capability.

This plan addresses all aspects of rotorcraft requirements through the year 2000 in the areas of certification, heliports, and the NAS. It is designed to interface with the NAS Plan and other planning documents that will guide agency actions for the remainder of the 20th century.

The Rotorcraft Master Plan is unique in that it is structured to address rotorcraft needs. Efforts residing in functional organizations of the FAA have been collectively directed toward a common set of agency rotorcraft goals. This process has also helped to establish interrelationships between functional activities for a comprehensive rotorcraft program. The roles of industry, NASA, DOD, and other elements of the rotorcraft community have been addressed in addition to FAA efforts. Close coordination and continued cooperation among all parties will be necessary to reap maximum benefit from this plan in the shortest possible time. Relationships currently existing between the manufacturing industry and other elements of the rotorcraft community suggest that such a cooperative climate is feasible.

Earlier versions of this plan have been given wide distribution and review within the FAA, other interested government organizations, and the rotorcraft industry. Briefings on this plan have been provided at national and international rotorcraft meetings and symposiums. A meeting was held with rotorcraft industry representatives June 28 through 30, 1983, specifically to obtain indepth industry comments and recommendations on this plan. Those

industry recommendations and comments, as well as the most current FAA program and project information, have been incorporated in this plan to the maximum extent feasible.

The FAA FY-87 Objectives dated August 1, 1986, require that the agency "...6. Develop/implement/revise FY-87 portions and, consistent with available funding, achieve 90 percent of the published milestones for the following plans: ...-Rotorcraft Master Plan...." Keeping this objective in mind, particular effort has been taken in this version of the plan to assist the reader in assessing progress and bridging any gap between this and previous editions of the plan by:

- o Explaining program/project slippages and accelerations.
- o Explaining evolvement and changes in projects.
- o Noting new and completed programs and projects.

Programs and projects are of two general types: those which encompass a definite timeframe for completion and those which are of a long-term, continuing nature and require the resources of FAA personnel on a day-to-day basis. The long-term, continuing programs and projects are identified by an asterisk on the index of programs/projects at the beginning of each chapter.

Finally, this plan advocates emphasis on the FAA role of "fostering aviation" for rotorcraft. Fostering activities in the public sector should include those similar to fixed-wing programs undertaken during the early years of air transportation.



## **OVERVIEW AND ILLUSTRATIONS**

## OVERVIEW

### Introduction.

Rotorcraft provide another dimension to air travel because they can operate from confined and unimproved areas and because they have a unique capability to maneuver at low airspeeds. In recent years, use of the helicopter has consistently increased. New uses and expansion of existing uses over the past decade prompted by improvements in helicopter design and capabilities have made the helicopter industry one of the fastest growing segments of civil aviation.

In 1985, the U.S. active civil helicopter fleet numbered approximately 7,904, over half of which were turbine-powered machines. An additional 7,404 rotorcraft comprised the military fleet in the continental United States in 1985. U.S. helicopter manufacturers produced 376 helicopters valued in excess of \$505 million in 1985. Approximately 42 percent of these units were exported (Figure 1).

There are more than 2,481 civil helicopter operators in the United States, Canada, Mexico, and Puerto Rico. Of this total, 46 percent were engaged in commercial ventures (using 67% of the civil helicopters) with the remainder being engaged in corporate/executive and civilian Government activities (Figure 2).

There are over 4,000 heliports and helistops in the United States and Canada, with the greatest geographic concentrations in the East, North Central, Central, Middle Atlantic, South, Pacific, and West (Figure 3).

Currently, despite a marginal economic climate, helicopter growth is expected to continue, although at a reduced-rate than in recent years. By 1995, the active fleet is expected to number approximately 8,300 rotorcraft (Figure 6). (Please Note: Data presented are for January 1 of the year indicated.) Figure 4 shows past and future projections in helicopter growth rate. The helicopter is in about the same stage of maturity and use that general aviation airplanes and commercial transports were when they experienced rapid expansion in usage and sales. This historical trend further emphasizes the need for the Federal Aviation Administration (FAA) to be prepared to accommodate future growth of rotorcraft. Forecasts indicate that before the turn of the century, city-center to city-center rotorcraft operations will be commonplace. Of the total estimated number of machines forecast to comprise the civil fleet at the close of this century, half are expected to be equipped for instrument flight rules (IFR) flight capability.

Although rotorcraft represent an important segment of the aviation system, today's environment is characterized by a system in which helicopters are newcomers—a system that was not designed to accommodate the special needs and capabilities of rotorcraft. Rotorcraft operations are significantly different from conventional fixed-wing operations. Rotorcraft operate offshore, in mountainous areas and in high density metropolitan areas—locations where navigation aids, communication, and radar coverage are not necessarily optimum for fixed-wing operations. Rotorcraft operations in high-density traffic areas add to the congestion of instrument approach facilities unless traffic flow management takes advantage of rotorcraft maneuverability and freedom from runway requirements. Although use of the air traffic control system for rotorcraft instrument flight enhances safety, procedures used in today's system tend to force the rotorcraft into a mold designed for fixed-wing operations.

## Background.

To deal with the unprecedented growth in the helicopter industry, the FAA Helicopter Operations Task Force (HOTF) was established in April of 1975. At that time, its sole purpose was to assist the industry in addressing problems associated with low-altitude IFR operations in offshore airspace adjacent to the contiguous States and Alaska. Over the past 10 years, task force responsibilities were greatly enlarged to accommodate changes in FAA organizational structure and to address the expansion of worldwide helicopter operations. This expanded role prompted a name change in late-1981 to FAA Rotorcraft Task Force (ROTAF). The ROTAF was composed of a Chairperson and 15 FAA specialists, each an expert in his own field, from various disciplines within the FAA.

The ROTAF guided and monitored agency rotorcraft interests in the three areas: Operations, Policy, and R&D. The ROTAF systematically identified and prioritized various agency rotorcraft efforts to ensure that appropriate emphasis and direction were provided for each program. Although the task force functioned effectively within its mandate, as more and more worldwide rotorcraft activity was generated, the entire FAA program needed to be restructured to provide greater responsiveness to the industry. The FAA responded to these changing needs by formulating a long-term plan of action over the next 2 decades. That action plan is this Rotorcraft Master Plan. The ROTAF now functions as an FAA/industry forum, meeting every other month to discuss a variety of national rotorcraft topics. The ROTAF provides an effective means for open communication and critique of national rotorcraft issues.

## Goals.

The central goal of this plan is to enhance the National Airspace System over the next 2 decades to assure that the unique capabilities of rotorcraft are employed to the maximum practical extent, to provide for an adequate system of VFR/IFR heliports, and to improve safety by upgrading certification criteria and promoting the use of advanced technology wherever possible.

Specific goals include:

- o Maintaining or improving the current levels of U.S. aviation safety by application of up-to-date rotorcraft safety standards, procedures, guidance, and surveillance. The scope of these activities includes initial certification, modification, manufacturing, operation, and continued airworthiness. In all activities, safety must be the primary consideration.
- o Aggressively pursuing opportunities to reduce, eliminate, or otherwise improve the agency's regulatory burden by continued systematic review of the regulatory program. Emphasis is placed on establishing meaningful, enforceable rotorcraft standards, which allow maximum flexibility in compliance while maintaining an appropriate level of safety.

- o Improving the agency's preeminence as the world aviation authority by providing rotorcraft technical guidance in international aviation activities and maintaining modern airworthiness and operations standards. This is accomplished through participation in international conferences, training, and the national resource specialist program.
- o Continuing the organizational development efforts designed to standardize and centralize application of rotorcraft certification, rulemaking, policy, and guidance.
- o Improving efficiency and capacity of the National Airspace System by improved automated operations, considering the specific and unique requirements of rotorcraft.
- o Developing 25 major urban area heliport systems by the year 2000 and a complementary national helistop/heliport program.
- o Minimizing rotorcraft environmental impact on the national air transportation system, while implementing the agency's statutory mandates for environmental protection.
- o Providing an environment in the NAS in which rotorcraft may operate as fuel efficiently as practicable. Figure 5 shows that rotorcraft operations are projected to account for a meaningful portion of our overall aviation fuel usage.

#### Assumptions.

During the formulation of this plan, many premises were considered and, as a result, a number of assumptions reached.

These assumptions include:

- o Demand for all types of aviation services will grow significantly during the next 20 years.
- o The expanded use of both civilian and military helicopters through the year 2000 will require more creative integration of the rotorcraft into the NAS.
- o The demand for urban area rotorcraft operations will increase both within the major metropolitan areas and between them.
- o Growth in rotorcraft fleet size will continue although somewhat slower than in recent years (Figure 6). Approximately one-half of these will be IFR equipped.
- o Federal funds will continue to be available to assist communities in heliport planning and construction.

- o With the advent of new, sophisticated simulator technology, pilot training, proficiency checks, and pilot certification will use this capability more often.
- o Responsibilities for certification, rulemaking, policy, and guidance will remain as presently established between Washington headquarters and the Rotorcraft Certification Directorate.
- o Development of new rotorcraft and derivatives of existing types will continue at about the present rate. Practical advanced technology machines and rotorcraft with higher maximum certificated takeoff weight will be in service by the year 2000.
- o Increased use of larger rotorcraft in urban areas will require considerable research and development in rotorblade and engine noise reduction application. Until adequate sound suppression measures are implemented, heliport development will be inhibited at many locations.
- o By the year 2000, the air traffic control system will be highly automated, with the controller and the pilot exercising primarily a managerial monitoring and override function in the IFR environment.
- o The major U.S. navigation system will have a 3-dimensional capability en route and a 4-dimensional capability at certain high-density urban areas.
- o Helicopter corridors will be feasible between city centers, and the ATC system will provide for direct random routing at low altitudes.
- o Existing separation standards will be reduced. Better use of the available airspace will be possible with refined area navigation (RNAV) systems, data link cockpit displays, advanced telecommunications technology, including satellite, and continuous telemetering to relay aircraft position information.
- o FAA will aggressively pursue opportunities to reduce, eliminate, or otherwise improve the regulatory burden consistent with maintaining or improving safety.
- o With more inherent stability being built into new production rotorcraft, more IFR operations will be conducted on a routine basis, and the use of rotorcraft will substantially increase (Figure 7).
- o Few low-cost rotorcraft will be available for personal and recreational use; however, with the advent of the ultralight personal conveyance rotorcraft falling within the scope of FAR Part 103, there will be an impact on both the NAS and the aircraft and pilot certification process.
- o Increasing worldwide production of IFR-capable rotorcraft will create an increased demand for more instrument qualified pilots (Figure 8).

- o Increased use of rotorcraft through the year 2000 will create additional requirements that will impact the agency's economic and manpower resources in the future. Fiscal and personnel constraints will continue to be applied consistent with national economic recovery policies.

#### Synopsis and Structure of This Plan:

The Rotorcraft Master Plan addresses all aspects of rotorcraft requirements through the year 2000 in the areas of certification, heliports, and the NAS. It is designed to interface with the NAS Plan and other planning documents that will guide agency actions for the remainder of the 20th century.

This plan integrates the many diverse rotorcraft-related efforts, both within and interfacing with the FAA, into coordinated major thrusts (Figure 9) with specific goals (Figure 10). It also describes evolutionary targets (Figure 11) along the path toward achieving these goals. Symbolology used in the plan is depicted in Figure 12.

Since the objective is to update the Rotorcraft Master Plan on a yearly basis, the resumes contained in the 1987 update have been entered into the automated resume system (ARS) which is a part of the aviation safety analysis system (ASAS) centered in Oklahoma City. Entering the resumes into the ARS will provide search capabilities (i.e., milestones, principal specialist, etc.) that were not previously possible with word processing equipment. Automating the Rotorcraft Master Plan resumes will also enable each responsible office, with access to ASAS, to update its resumes as changes occur. Keeping each project entry current will not only provide an efficient management tool but will also simplify updating the Rotorcraft Master Plan. Although the resumes appear in a slightly different layout than those in the May 1986 Rotorcraft Master Plan, they contain the same information. The resume numbering system has also been revised to permit entry of the resumes into the ARS. The new numbering system is described in a later part of this section.

The composition of this plan, in consonance with the overview, includes a sequence of three evolution diagrams (Figures 13, 16, and 18). These depict rotorcraft projects, programs, and ongoing efforts in each of three major areas: National Airspace System, Heliports, and Certification. All rotorcraft activities addressed in this plan are reflected in one or more of these major areas. This plan identifies a series of goals and milestones over the next 14 years. Achievement of these objectives will provide the basis for assuring that concise and systematic steps are taken to provide the optimum environment for rotorcraft as the year 2000 approaches.

A major effort is planned to enhance the NAS for rotorcraft (Figure 13). The availability and reliability of navigation, communication, and surveillance coverage at low altitudes currently tend to inhibit the efficient operation of rotorcraft. For example, the reduction in VOR coverage at low altitude is evident from a comparison of Figures 14 and 15.

Another important effort is planned in the heliports area (Figure 16). Within the heliports area, a joint FAA/industry program will lead to an establishment of design criteria and standards for heliports with full IFR precision approach capability (Figure 16). This systematic evolution will be accomplished through the efforts of joint FAA/industry coordination and working groups. Initial evaluation of new techniques and/or technologies will be carried out at the National Concept Development Heliport located at the Federal Aviation Administration Technical Center, Atlantic City, New Jersey. Field testing and/or further evaluation will be carried out at selected public-use heliports such as: Indianapolis, Indiana; New York, New York; or New Orleans, Louisiana. Additional public-use heliports are expected to be developed with funds from the Airport Improvement Program or successor programs. The FAA/Industry National Prototype Heliport Demonstration and Development Program (Figure 17) will provide an advanced demonstration of all-weather heliport capability using the most up-to-date equipment available.

This effort is in conjunction with industry and addresses the establishment of IFR heliport criteria and standards and facilities with full IFR precision approach capability between now and 1989. Although full IFR capability is not envisioned until the 1988-89 timeframe, case-by-case interim approvals of various new and existing technologies will provide for a systematic evolution from basic VFR configuration to IFR non-precision approach capability in 1987-88 and to full IFR precision approach capability in 1988-89. This systematic evolution will be accomplished through the efforts of joint FAA/industry coordination and working groups. Evaluation of new technologies will be accomplished at the National Concept Development Heliport at the FAA Technical Center in Atlantic City, New Jersey, which was dedicated on June 12, 1987, and at the National Prototype Demonstration Heliports. At the conclusion of successful testing and certification, new systems and equipment will be made available for installation and operational use at the National Prototype Demonstration Heliports. The FAA expects to support construction of the prototype heliports with funding through the Airport Improvement Fund (AIP).

The FAA has selected New York, NY; New Orleans, LA; Indianapolis, IN; and Los Angeles, CA, as sites for its National Prototype Demonstration Heliport Program. These facilities will be equipped with the most advanced technology flight aids, including the new generation microwave landing system (MLS) and automated weather observing systems (AWOS). Federal funding for the New Orleans heliport was approved, and the heliport was opened and commenced operation in January 1986. The New Orleans heliport is located adjacent to the Super Dome sports stadium. The Indianapolis Heliport became operational in May 1985. The New York City site is the present Wall Street heliport. It first opened in December 1960. Construction of the new facilities is nearly completed. The Los Angeles Heliport is expected to be located in downtown Los Angeles near Union Station.

Certification (Figure 18) is an important major effort encompassing type and airworthiness certification of rotorcraft, manufacturing and maintenance personnel, facility certification and surveillance, and operations (airman and operator certification and surveillance).

Each project depicted on the evolutionary diagrams (Figures 13, 16, and 18) is reflected on an expanded program and/or project sheet. The detailed description of the project includes its purpose and goals, nature of the problem, approach used, subtasks, program schedule, and related efforts. The detailed project descriptions are intended to be updated annually as funds are obligated and the program progresses.

Each program/project effort reflected on the evolution diagram includes a reference code. The first three digits of this code represent the element having primary responsibility for that effort as follows:

- AAT - Air Traffic
- AVS - Aviation Standards
- ASW - Rotorcraft Certification Directorate
- ARP - Airports
- API - Policy and International
- ADL - Development and Logistics

The first two numerical designators indicate the year in which the program or project was initiated. The second set of numerical designators indicate either a program or project. Generally, a program is a comprehensive or overall effort which may encompass several more detailed, related projects. Designators ending in zero indicate a program (010, 020, 030, etc.); all other numerical designators indicate a project within that program area. The letter (M) designates a program or project entered in the ARS for the Rotorcraft Master Plan. For example, AVS-82-024-M is an Aviation Standards project initiated in 1982 involving MLS collocated site criteria within the program area of Resume AVS-82-020-M, Instrument Enroute and Terminal Procedures (TERPS).

An index of the programs and projects appears at the beginning of Chapters 2 through 7. Appearing in the left-hand margin of each index page is an impact indicator that portrays where the thrust of a particular program/project is expected to have the greatest impact—in the area of National Airspace System (N), Heliports (H), or Certification (C).

Certain resumes in this plan are identified by an asterisk in the index at the beginning of each chapter. These are long-term, continuous efforts usually associated with basic responsibilities and functions of the agency and normally contain no identified milestones. These resumes have been in the plan since its inception. We are continuing to include them in the 1987 RMP to illustrate the agency's day-to-day commitment of resources and involvement with rotorcraft in addition to those rotorcraft projects with finite starting and end dates and measurable milestones.

This plan is unique in that it seeks to address the roles of industry, NASA, DOD, and other elements of the rotorcraft community in addition to FAA efforts. Close coordination and continued cooperation among all elements will be necessary to reap maximum benefits from this plan in the shortest possible time. Relationships currently existing with the industry and other elements of the rotorcraft community suggest that such a cooperative climate is feasible.



# **U.S. Rotorcraft Data**

***(United States, Canada, Mexico, and Puerto Rico)***

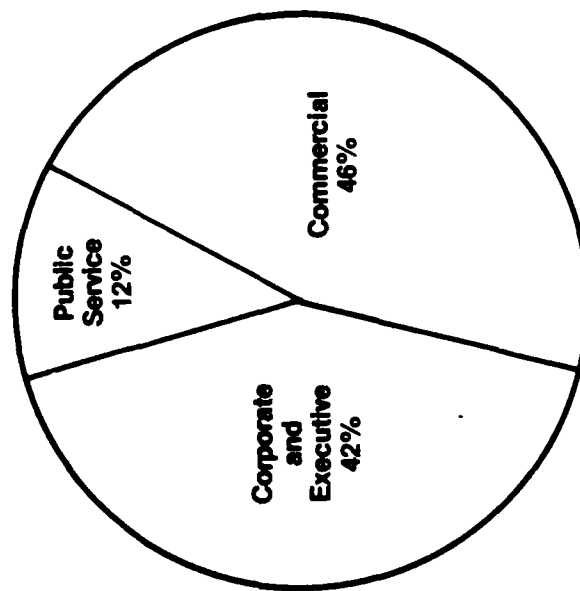
**1985**

- **Active Civil: 7,904**
- **Military (Continental U.S.): 7,404\***
- **1985 Production: 376**
- **1986 Production: 330**
- **Value: \$505 Million (1985 Production)**
- **Value: \$288 Million (1986 Production)**
- **Exports: 42% (Approximately)**
- **Operators: 2,481**
- **Heliports/Helistops  
(U.S., Canada, and Puerto Rico): 4,232**

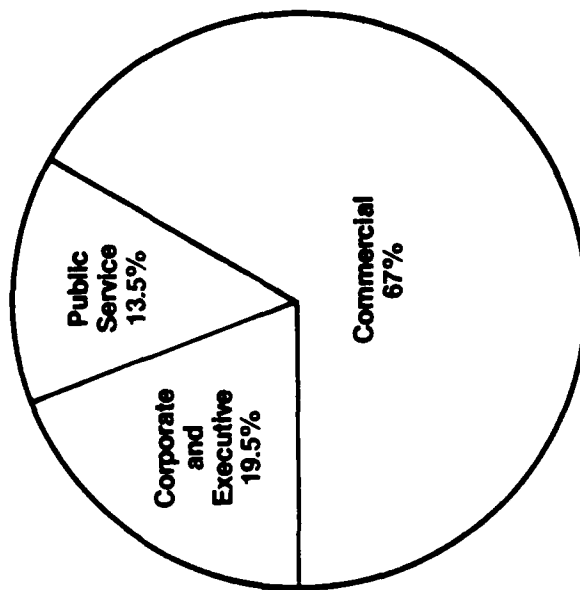
Source: Aerospace Facts and Figures 1986-1987 (Aerospace Industries Association of America, Inc.)

\*FAA Aviation Forecasts, Fiscal Years 1987-1998, February 1987 edition; FAA-APO-87-1 (Federal Aviation Administration)

# **Helicopter Operator and Helicopter Distribution by Primary Mission**



**Distribution of Civil Helicopter Operators by Primary Mission**



**Distribution of Civil Helicopters (No. of Aircraft) by Primary Mission**

Source: Aerospace Facts and Figures 1986-1987 (AIA)

**Figure 2**

# Helicopter Landing Sites Concentration

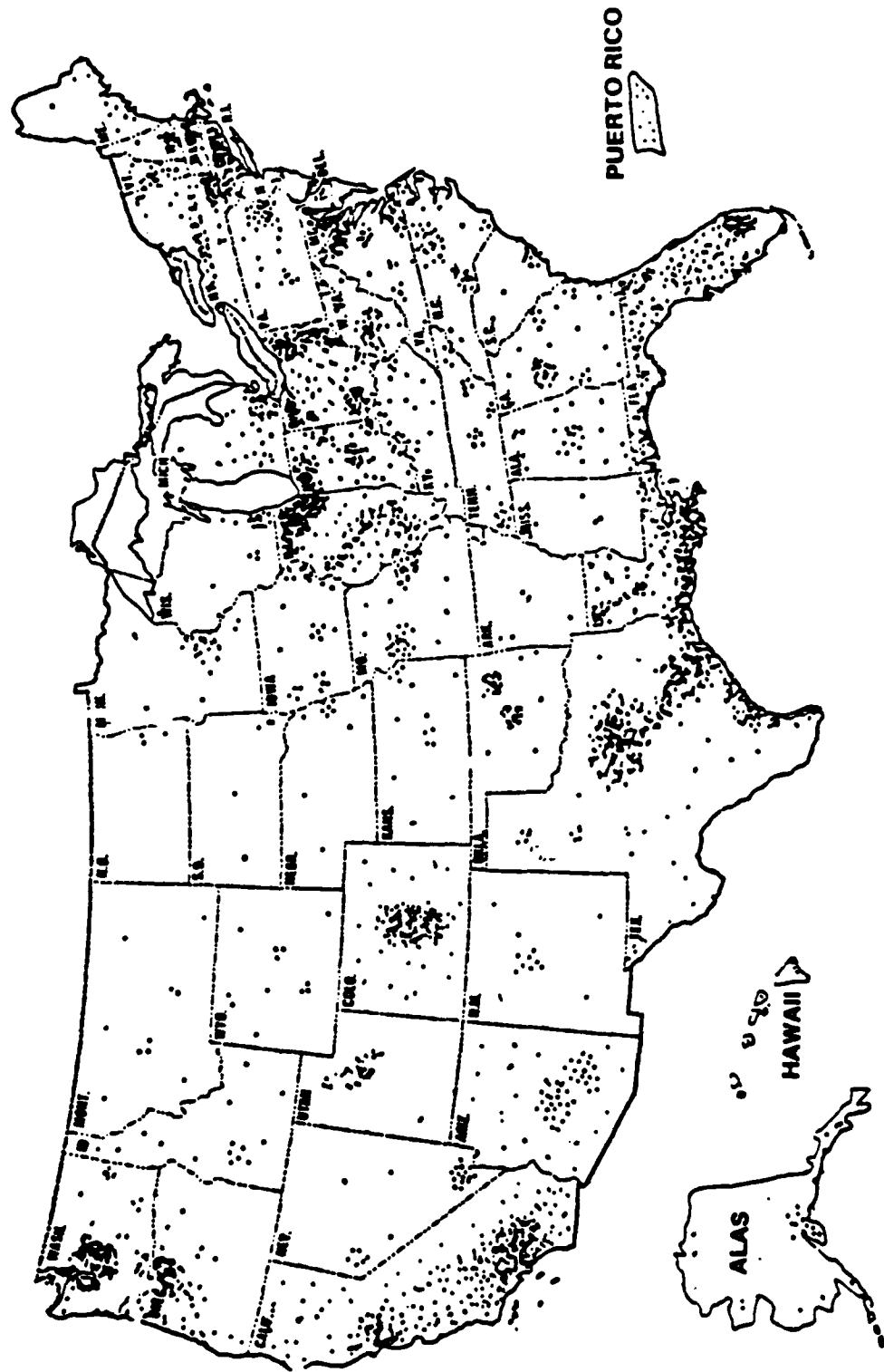


Figure 3

# Estimated Industry Growth— Active Small & Medium Helicopters

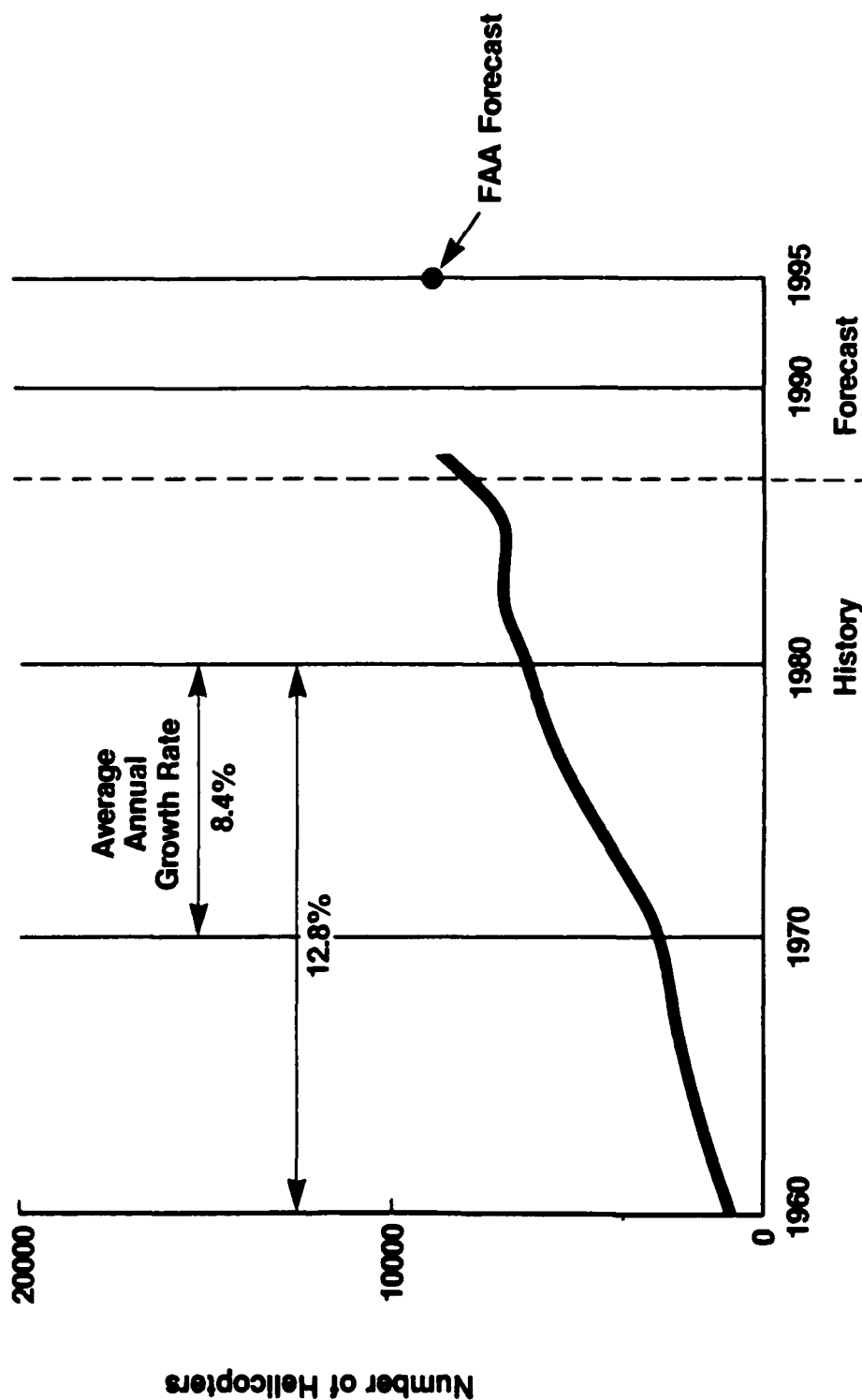


Figure 4

# Fuel Use

General Aviation Aircraft Fuel Consumption  
(millions of gallons)

Fiscal Year	Fixed Wing					Rotorcraft		Total
	Piston		Turboprop	Turboprop	Turboprop	Piston	Turbine	Other
	Single-Engine	Multi-Engine						
Historical*								
1980	287.6	231.1	223.9	474.6	13.3	59.7	0.8	1,291.0
1981	276.5	206.1	219.6	483.2	13.3	57.8	0.8	1,257.3
1982	251.2	197.4	230.8	562.1	9.7	62.5	0.5	1,314.2
1983	235.1	189.3	230.9	396.2	7.8	54.2	0.4	1,113.9
1984	248.8	196.3	236.4	408.0	8.5	62.9	0.2	1,161.1
1985	249.4	178.4	210.2	433.2	8.7	58.9	0.1	1,138.9
1986E	242.9	168.8	200.6	453.5	8.7	61.6	0.1	1,136.2
Forecast								
1987	239.7	167.9	207.7	480.6	8.7	66.0	0.1	1,170.7
1988	237.5	167.9	210.1	507.7	8.7	66.9	0.1	1,198.8
1989	236.2	165.3	217.3	514.4	8.7	69.5	0.1	1,211.5
1990	235.1	164.4	222.0	514.4	8.7	75.7	0.1	1,220.4
1991	233.9	164.4	229.2	534.7	8.7	80.1	0.1	1,251.1
1992	235.4	164.4	243.6	582.1	8.7	86.2	0.1	1,320.5
1993	236.7	167.0	255.5	615.9	7.7	90.6	0.2	1,373.6
1994	236.9	167.9	265.1	643.0	7.3	94.2	0.2	1,414.6
1995	237.7	167.9	267.5	649.8	7.3	97.7	0.2	1,428.1
1996	238.0	170.5	274.6	670.1	7.3	101.2	0.2	1,461.9
1997	238.8	171.4	277.0	697.1	7.3	104.7	0.2	1,496.5
1998	239.1	171.4	284.2	703.9	7.3	108.3	0.3	1,514.5

\*Source: FAA APO Estimates

E = Estimate

Figure 5

# Estimated Active General Aviation Aircraft by Type of Aircraft

(in Thousands)

As of January	Fixed Wing					Rotorcraft		Total
	Piston		Turboprop	Turbojet	Piston	Turbine	Other	
	Single- Engine	Multi- Engine						
Historical*								
1980	168.4	25.1	3.5	2.7	3.1	2.7	4.8	210.3
1981	168.4	24.6	4.1	3.0	2.8	3.2	4.9	211.0
1982	167.9	25.5	4.7	3.2	3.3	3.7	5.0	213.3
1983	164.2	25.0	5.2	4.0	2.4	3.7	5.2	209.7
1984	166.4	25.1	5.5	3.9	2.5	4.0	5.9	213.3
1985	171.9	25.5	5.8	4.3	2.9	4.2	6.3	220.9
1986	164.4	23.8	5.4	4.4	2.9	3.6	6.3	210.7
Forecast								
1987	163.7	23.6	5.5	4.6	2.8	3.8	6.4	210.4
1988	162.3	23.5	5.6	4.8	2.7	4.0	6.7	209.6
1989	161.0	23.4	5.7	5.0	2.6	4.2	7.0	208.9
1990	160.0	23.3	5.9	5.2	2.6	4.4	7.3	208.7
1991	159.4	23.2	6.1	5.4	2.5	4.7	7.6	208.9
1992	158.8	23.2	6.3	5.6	2.5	5.0	7.9	209.3
1993	160.0	23.3	6.6	5.9	2.5	5.3	8.3	211.9
1994	160.5	23.4	6.9	6.2	2.4	5.6	8.6	213.6
1995	161.0	23.5	7.1	6.4	2.4	5.9	8.9	215.2
1996	161.5	23.6	7.3	6.6	2.3	6.1	9.2	216.6
1997	162.0	23.7	7.5	6.8	2.2	6.3	9.5	218.0
1998	162.5	23.8	7.7	7.0	2.1	6.5	9.7	219.3

\*Source: FAA Statistical Handbook of Aviation

Notes: Detail may not add to total because of independent rounding.

An active aircraft must have a current registration and it must have been flown at least one hour during the previous calendar year.

Figure 6

# Flight Hours Forecast—

Estimated Hours Flown in General Aviation by Type of Aircraft  
(millions)

Fiscal Year	Fixed Wing					Rotorcraft		Total
	Piston		Turboprop	Turbopjet	Piston	Turbine	Other	
	Single-Engine	Multi-Engine						
Historical*								
1980	28.8	6.6	2.1	1.3	0.9	1.8	0.4	41.9
1981	27.9	6.4	2.2	1.5	0.8	1.8	0.4	41.0
1982	25.2	6.0	2.1	1.6	0.6	1.8	0.4	37.7
1983	23.8	5.8	2.2	1.5	0.6	1.7	0.4	36.0
1984	23.4	5.7	2.4	1.6	0.6	1.9	0.4	36.0
1985	23.4	5.7	2.6	1.8	0.6	1.7	0.4	36.2
1986	22.4	4.8	2.1	1.7	0.6	1.8	0.4	33.8
Forecast								
1987	22.2	4.8	2.2	1.8	0.6	1.9	0.4	33.9
1988	21.9	4.8	2.2	1.9	0.6	1.9	0.4	33.7
1989	21.8	4.7	2.3	1.9	0.6	2.0	0.4	33.7
1990	21.7	4.7	2.4	2.0	0.6	2.2	0.4	34.0
1991	21.6	4.7	2.4	2.1	0.6	2.3	0.4	34.1
1992	21.8	4.7	2.6	2.2	0.6	2.5	0.4	34.8
1993	21.9	4.8	2.7	2.3	0.5	2.6	0.5	35.3
1994	21.9	4.8	2.8	2.4	0.5	2.7	0.5	35.6
1995	22.0	4.8	2.8	2.4	0.5	2.8	0.5	35.8
1996	22.0	4.9	2.9	2.5	0.5	2.9	0.6	36.3
1997	22.1	4.9	2.9	2.6	0.5	3.0	0.6	36.6
1998	22.1	4.9	3.0	2.6	0.5	3.1	0.6	36.8

\* Source: FAA Statistical Handbook of Aviation

E = Estimate

Notes: Detail may not add to total because of independent rounding.

Figure 7

# Instrument Rated Pilots

Estimated Total and Instrument Rated Pilots  
December 31, 1981-85

Calendar Year	Total, Pilots	Instrument Rated Pilots	
		Number	Percent of Total
1985 .....	562,888	258,559	46
1984 .....	572,295	256,584	45
1983 .....	570,807	254,271	45
1982 .....	576,894	255,073	44
1981 .....	584,270	252,535	43

Source: FAA

Estimated: Data is based on a 27-month criteria. Past years are based on a 25-month criteria. Excludes student pilots.

Estimated Instrument Ratings Held by Class of Certificates:  
December 31, 1985 and 1984

Class of Certificates	1985	1984	Percent Change 1985-1984
Total—all groups .....	258,559	256,584	+ 1
Private pilots—total .....	43,902	43,312	+ 1
Commercial pilots—total .....	126,352	128,978	- 2
Airline transport pilots—total .....	82,740	79,192	+ 4
Rotorcraft pilots—total .....	5,565	5,102	+ 9

FAA statistical handbook of aviation calendar year 1985.

Figure 8



# Master Plan Functions

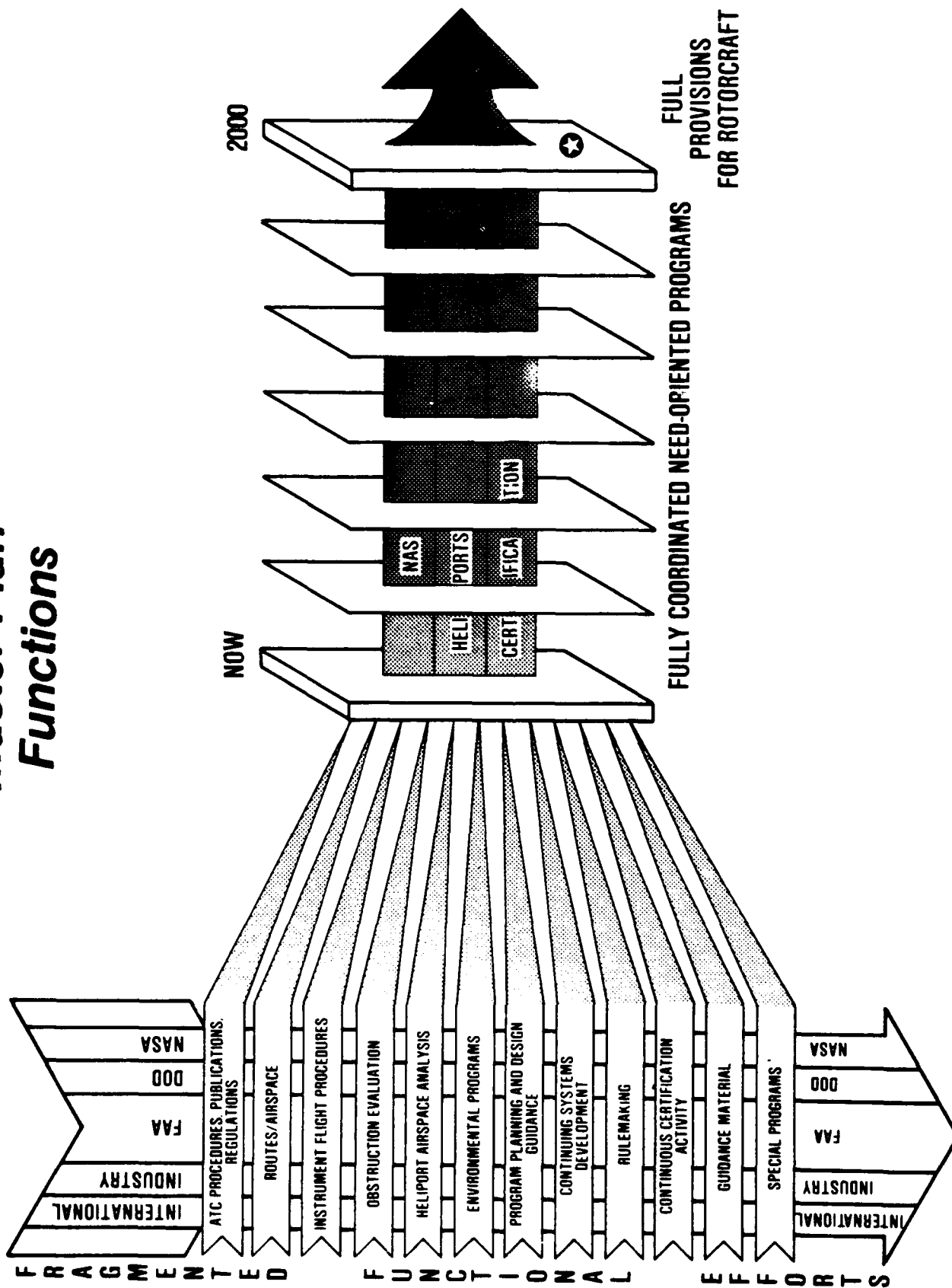
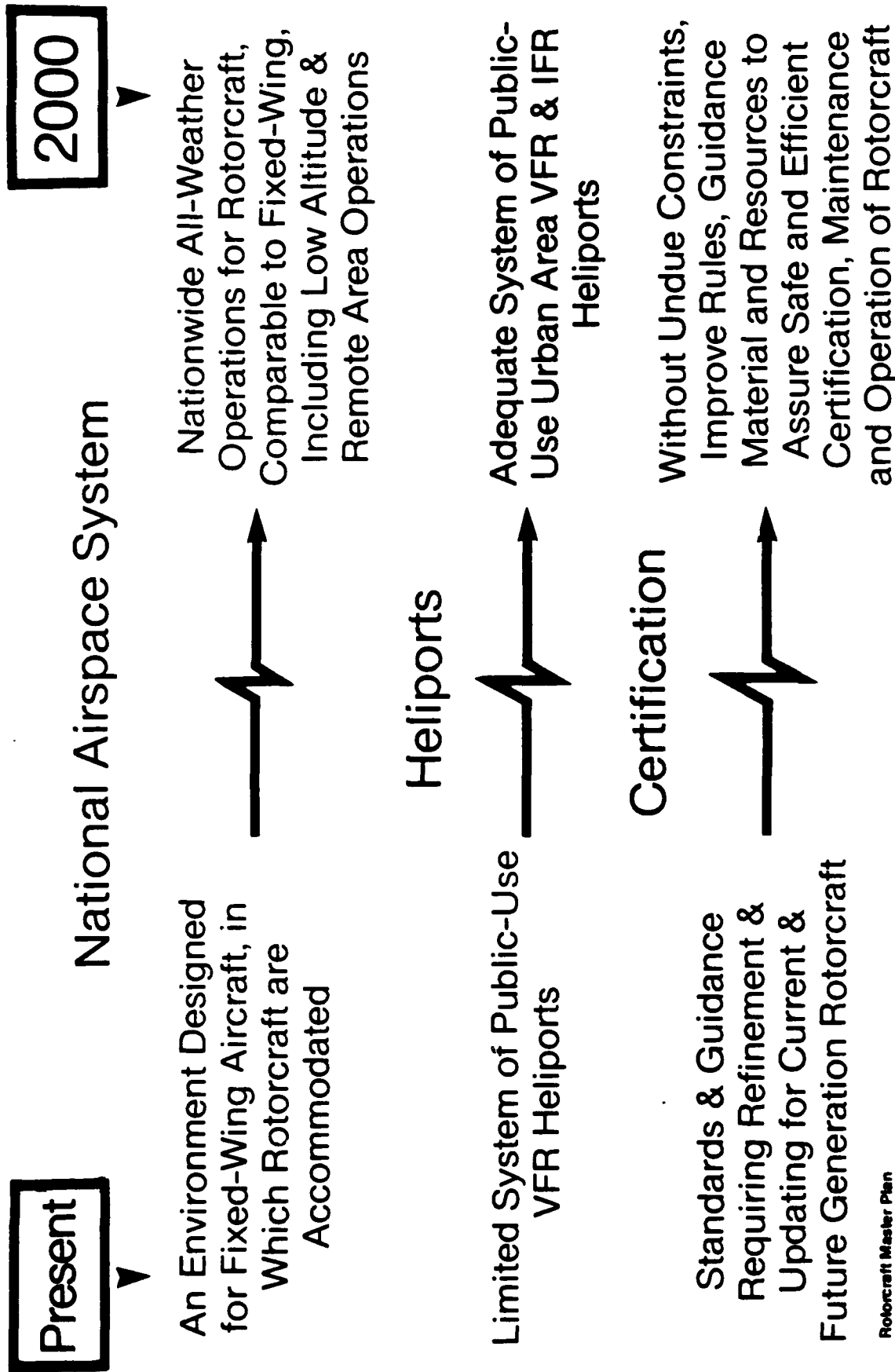


Figure 9

# Where We Are-Where We're Going



# Evolution Targets

	1985	1990	1995	2000
ROTORCRAFT	<p>★ CURRENT MAX OF HELOS -- SMALLER W/F &lt; 6000 LBS -- 50% W/F DELIV</p> <p>★ INCREASING DELIV OF 10 000 LB 140 KT W/F MACHINES</p> <p>★ LARGER LONGER RANGE FASTER MACHINES 20 000 30 000 LB 180 KT</p> <p>★ NEW ROTORCRAFT CONCEPTS IN USE (11K THROTH ON) 50 000 LB 300 KT HIGH ALTITUDE CRUISE</p> <p>★ 2000 MLR 30 TON PAYLOAD X WING MARCH 9</p>			
A/C SYSTEMS	<p>★ ADVANCED FLIGHT SYSTEMS PROVIDED BY INDUSTRY</p> <p>★ INDUSTRY PROVIDES IMPROVED VISUAL CUES</p> <p>★ TYP MIN W/F SPEED 40 KTS</p> <p>★ APPROXIMATE IMAGING SYSTEMS BECOME COST EFFECTIVE REMOTE/OFFSHORE PRECISION APPROACH/DEPARTURES W/O HELS</p>			
AIRSPACE/ NAS EQUIP	<p>★ IMPROVED ROUTE STRUCTURES IN 4 HIGH CONCENTRATION AREAS</p> <p>★ FAR PROVIDES W/F SYSTEMS DESIGN &amp; SERVICES FOR INDUSTRY</p> <p>★ DISCRETE HELICOPTER &amp; APPROACH W/ NYC INT AREA</p> <p>★ W/F WITH PRECISION APPROACH DEPARTURE (PUBLIC) RANDOM ROUTING INDUSTRY</p> <p>★ W/F AVAILABLE 140 KTS AT HELPORT</p> <p>★ HIGH/LOW ALTITUDE ATC PROCEDURES FOR NEW GEN ROTORCRAFT</p> <p>★ REMOTE/LOW ALT NAV/CORR SURVEIL ATC SYSTEM</p> <p>★ RANDOM ROUTES FOR LOW ALT AREAS</p>			
HELIPORTS	<p>★ FAA/INDUSTRY NATIONAL PROTOTYPE DEMONSTRATION HELIPORT &amp; DEV PROGRAM</p> <p>★ 1st NATIONAL PROTOTYPE DEMONSTRATION HELIPORT WITH NONPRECISION LANDING</p> <p>★ PUBLISHED ALL W/F HELIPORT DESIGN CRITERIA</p> <p>★ LARGER HELIPORTS FOR HEAVY HELICOPTERS</p> <p>★ 1st PUBLIC USE HELIPORT BUILT UNDER PUBLISHED ALL W/F CRITERIA</p> <p>★ ALL W/F HELIPORTS W/SUPPORTING TERMINAL AREA ROUTE STRUCTURE IN 15 MAJOR CITIES</p> <p>★ ALL W/F HELIPORTS W/SUPPORTING TERMINAL AREA ROUTE STRUCTURE IN 25 MAJOR CITIES</p>			
CERTIFICATION	<p>★ 1st U.S. WING CERT</p> <p>★ ALL W/F HELICOPTER CURRENT GENERATION ROTORCRAFT W/F CERT</p> <p>★ LOW SPEED W/F CERT</p> <p>★ ROTORCRAFT REGULATORY NEWLY COMPLETED</p> <p>★ NEW ROTORCRAFT CONCEPTS CERTIFIED</p> <p>★ W/F WING CERT</p>			
POLICY		<p>★ FAA FORECASTING COST BENEFIT TOOLS</p> <p>★ CONTRIBUTING PUBLIC AWARENESS PROGRAMS</p>		

Figure 11

# Plan Symbolology

- Projects in Being;  
Near Term Plans
 

△	= Start
▽	= End
○	= Event
- Estimates; Long Term  
Plans
 

△	= Start
▽	= End
□	= Event
- Program Office Plan  
Approval; Funding  
of Required Efforts
 

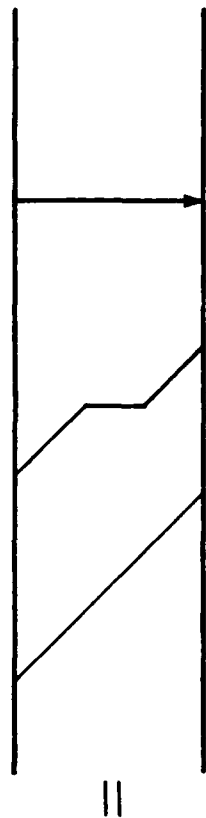
■	= Approved, Fully Funded
///	= Partially Approved, Partly Funded
...	= Not Approved, No Funding

Rotorcraft Master Plan

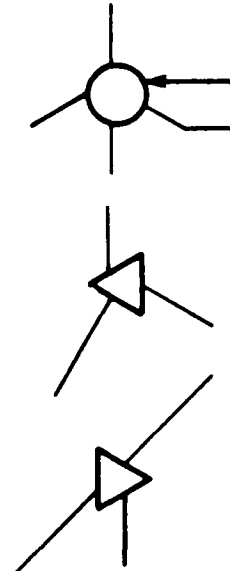
# Plan Symbolology

## (Continued)

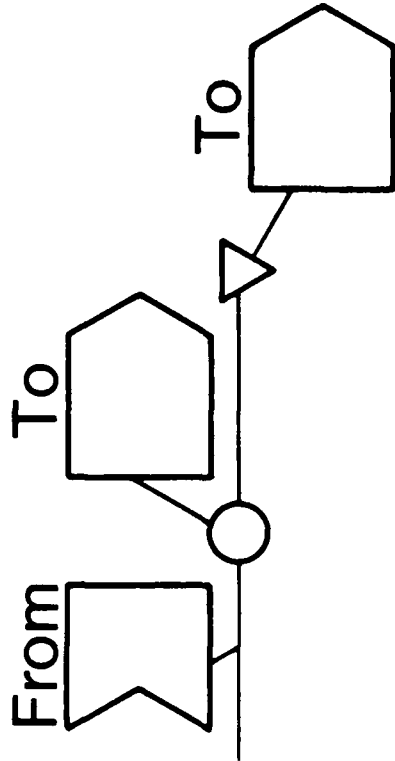
- Primary Goal = ★
- Secondary Goal = ☆
- Feeding of Results into On-Going Task/Project/Program
- Feeding of Results From or Into a Specific Event
- Handoff of Product From One Category to Another



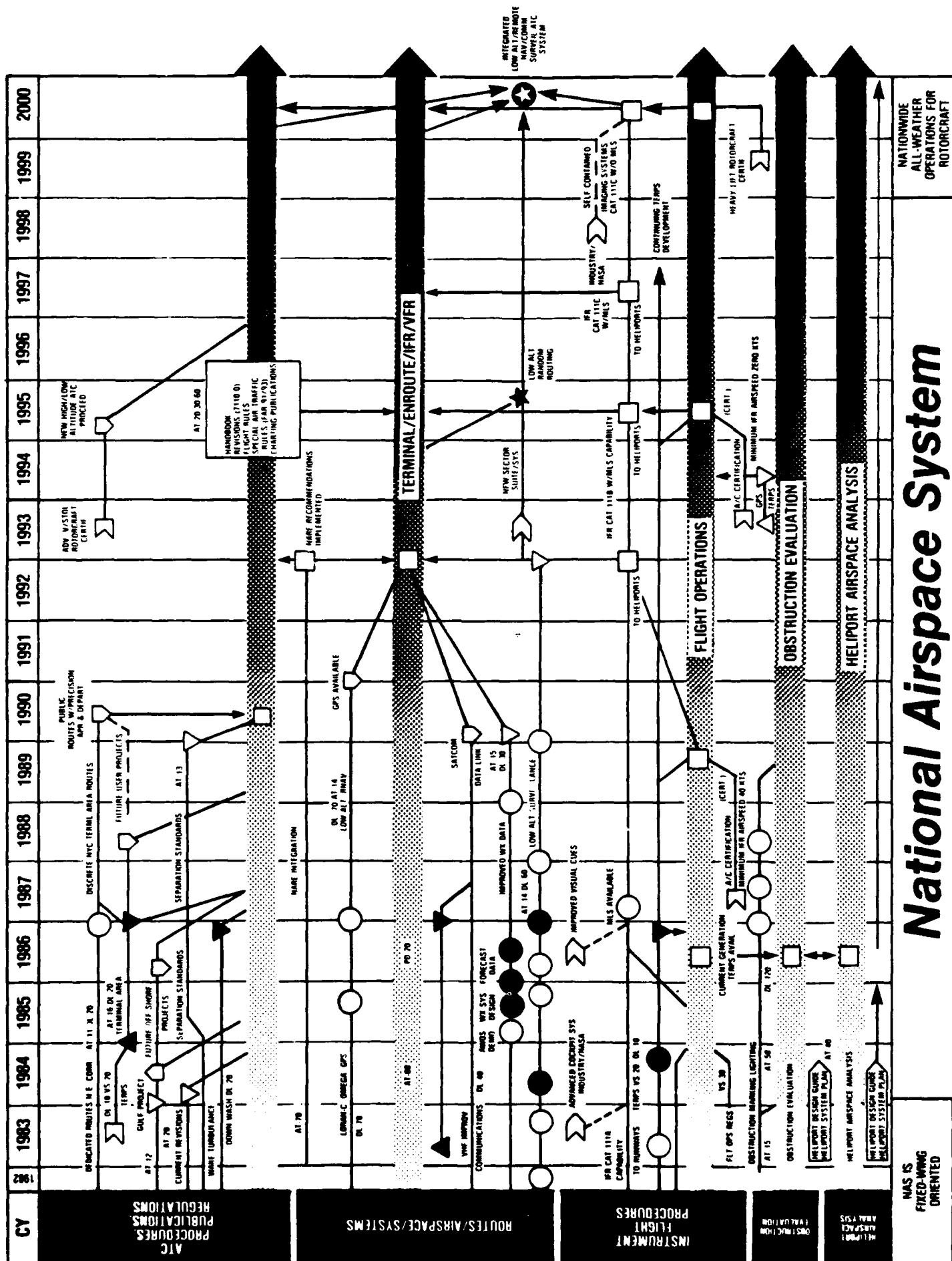
=



=



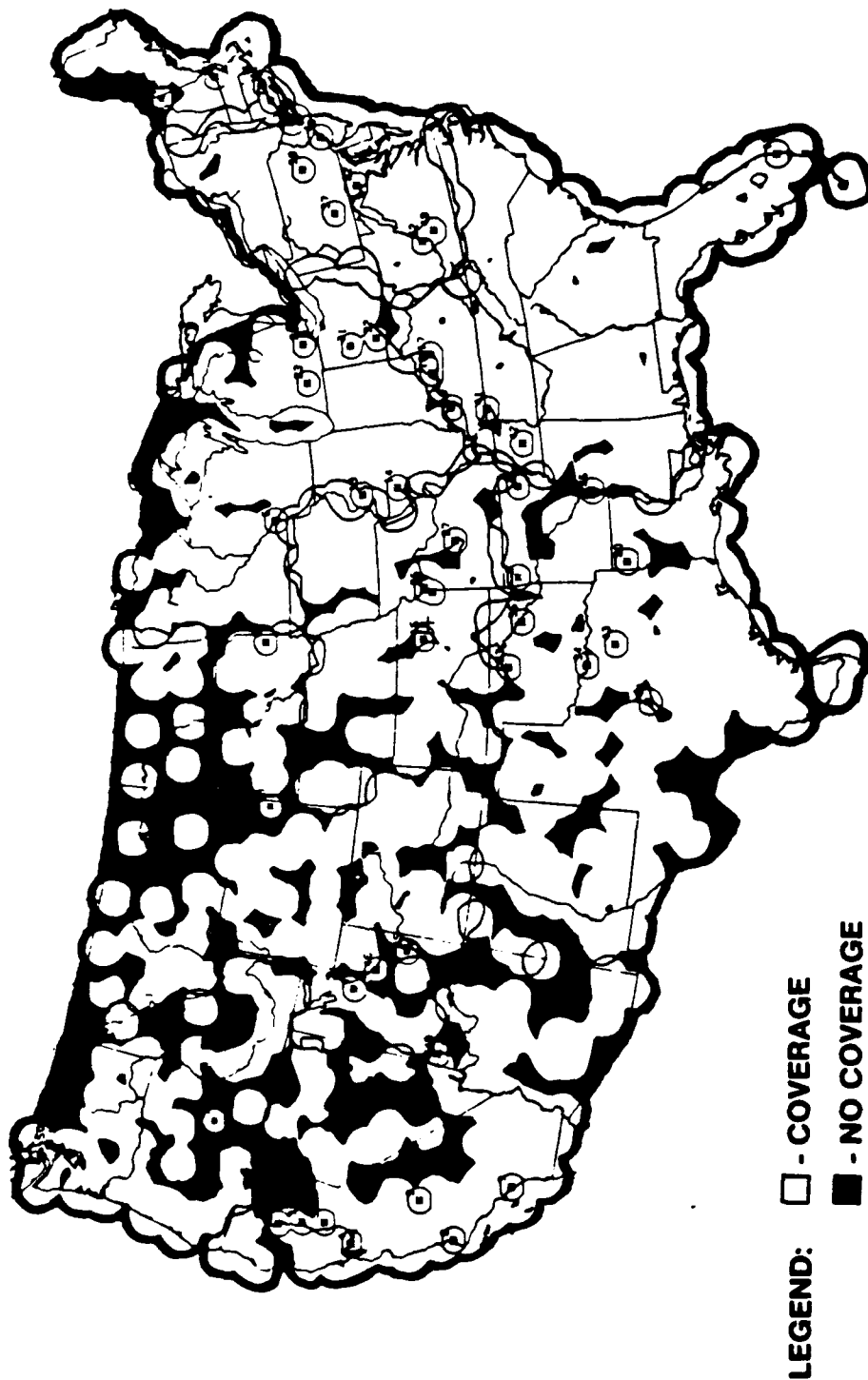
=



# National Airspace System

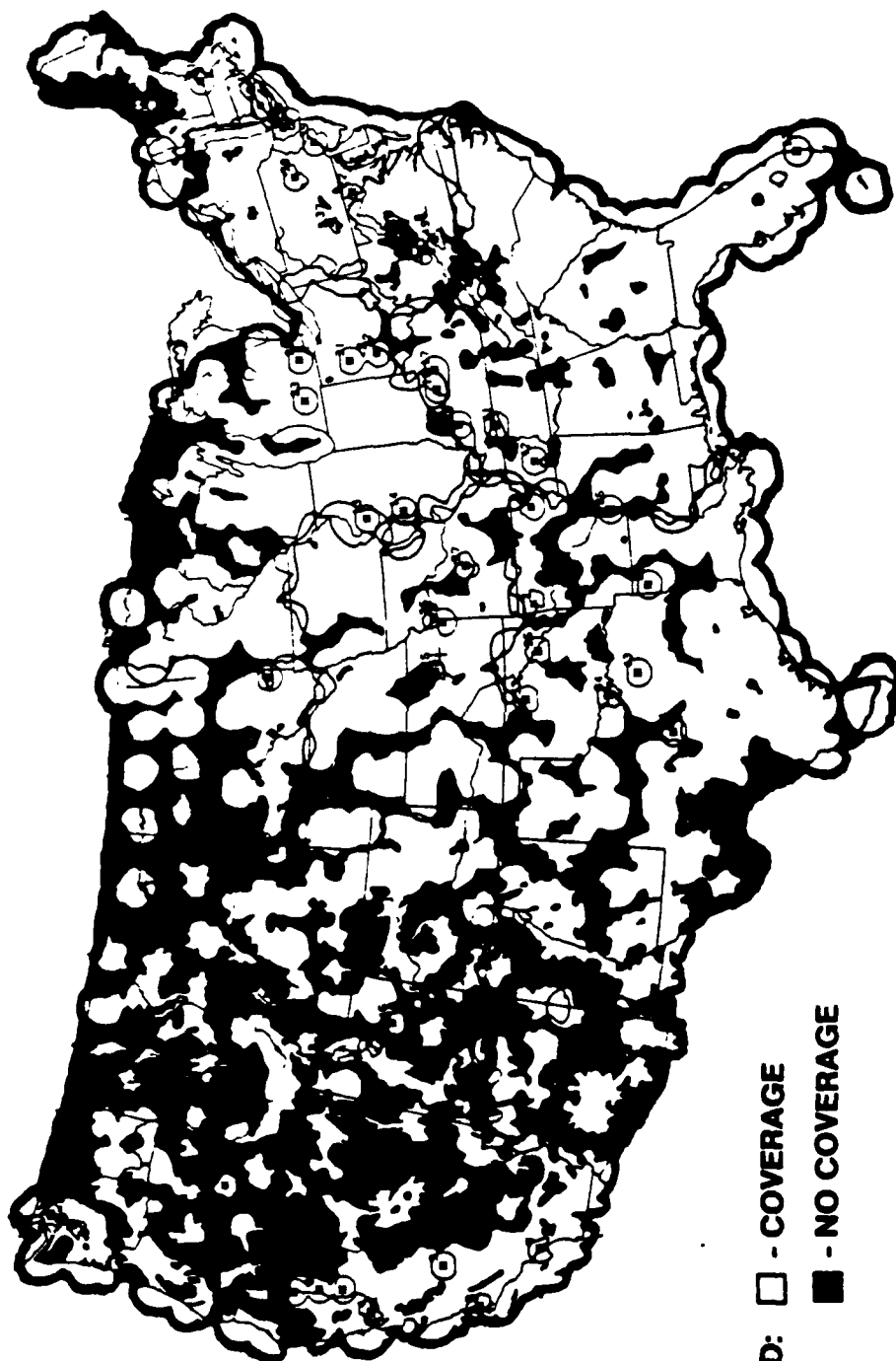
Figure 13

# Composite Coverage VOR Coverage at 8,000 Feet AGL



VOR COVERAGE AT 8000 FEET ABOVE GROUND LEVEL (AGL)

# Composite Coverage VOR at 1000' AGL



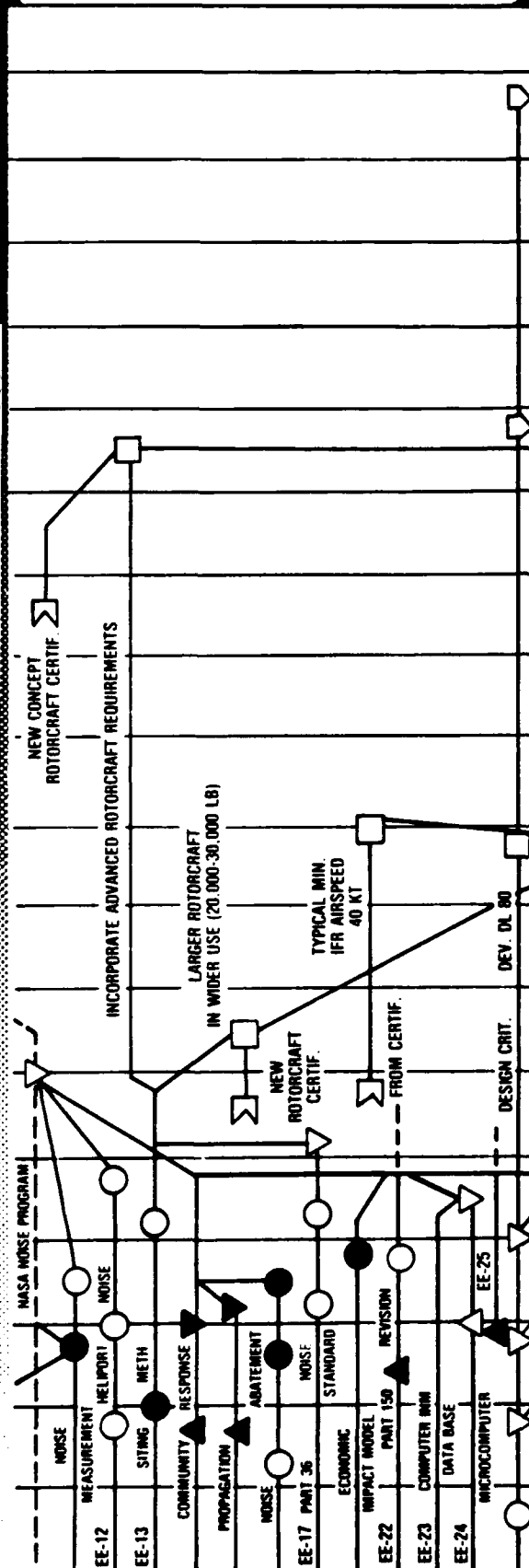
LEGEND: ☐ - COVERAGE  
☒ - NO COVERAGE

VOR COVERAGE AT 1000 FEET ABOVE GROUND LEVEL (AGL)



CY 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000

ENVIRONMENTAL DESIGN-INDUSTRY



ADVISORY SERVICES & PUBLIC/INDUS. LIAISON

PLANNING AND DESIGN GUIDANCE

FAA/INDUSTRY RP 17 ALL-WX HELIPORT DEV & DEMO PROGRAM VS-220 RP 11 RP 12 RP 13

DESIGN CRIT. DEV. DL 80 RP 14 ALL-WX CRIT PUBLISHED RP 15 RP 20 DESIGN GUIDE REVISION

DESIGN CRIT. DEV. DL 80 RP 14 ALL-WX CRIT PUBLISHED RP 15 RP 20 DESIGN GUIDE REVISION

DESIGN CRIT. DEV. DL 80 RP 14 ALL-WX CRIT PUBLISHED RP 15 RP 20 DESIGN GUIDE REVISION

DESIGN CRIT. DEV. DL 80 RP 14 ALL-WX CRIT PUBLISHED RP 15 RP 20 DESIGN GUIDE REVISION

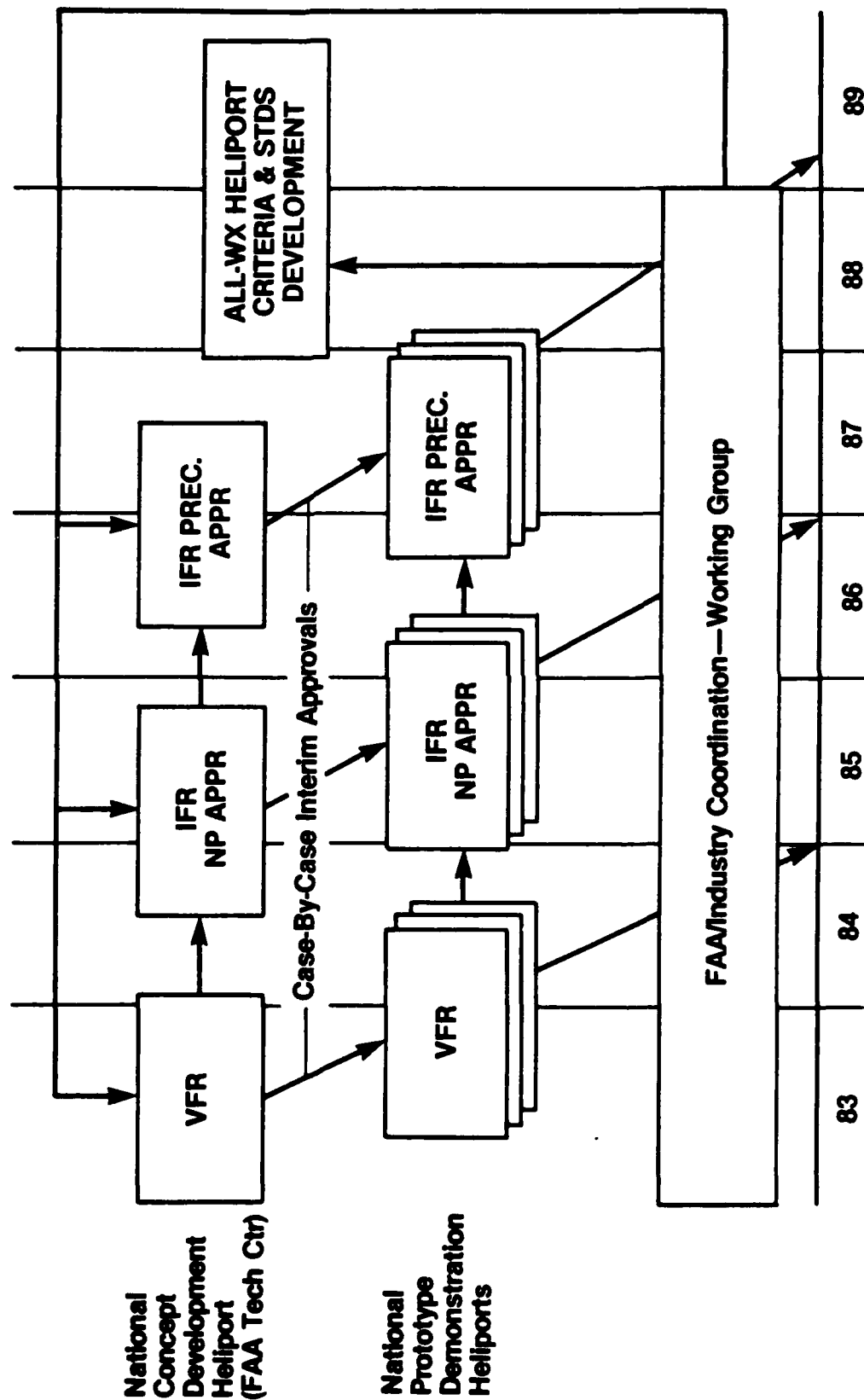
DESIGN CRIT. DEV. DL 80 RP 14 ALL-WX CRIT PUBLISHED RP 15 RP 20 DESIGN GUIDE REVISION

DESIGN CRIT. DEV. DL 80 RP 14 ALL-WX CRIT PUBLISHED RP 15 RP 20 DESIGN GUIDE REVISION

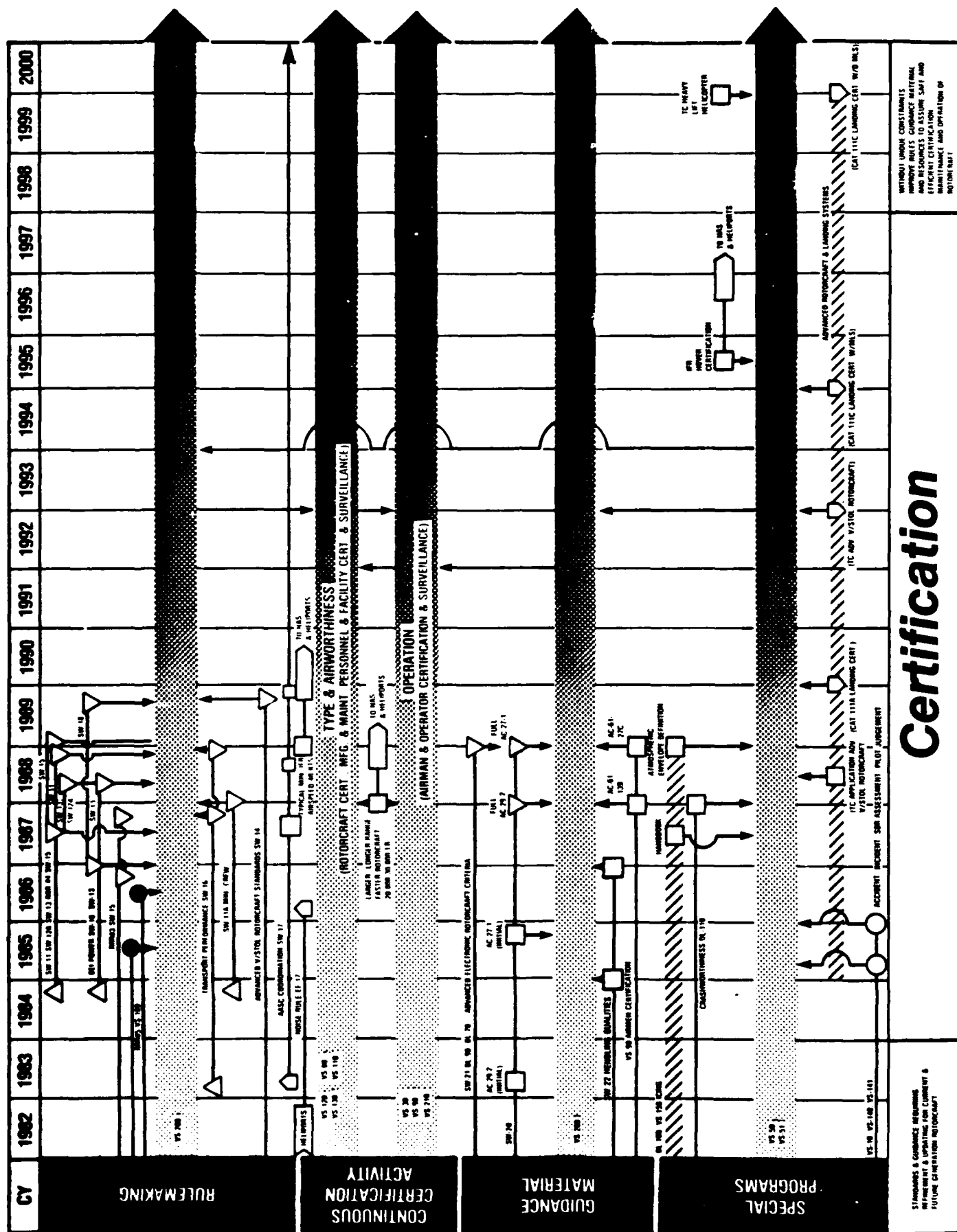
# Heliports

ADAPTED FROM THE REPORT OF THE NATIONAL RESEARCH COUNCIL ON AVIATION AND SPACE TRANSPORTATION, "Heliports: A National Study of the Role of Heliports in the Nation's Transportation System," 1982.

# **FAA/Industry National Prototype Heliport Demonstration & Development Program**



**Figure 17**



# **AIR TRAFFIC PROGRAMS**

## AIR TRAFFIC SUMMARY

### 1. Major Accomplishments Include:

- (1) Recent changes to the Air Traffic Controller's Handbook (7110.65) which are specifically targeted at facilitating the movement and handling of rotary wing aircraft include the following.
  - a. Runway Definition—The term runway has been redefined to mean the runway used by aircraft, and in discussions of separation standards, the term runway is applicable to helipads and accompanying takeoff/landing courses.
  - b. Radar Departures—Helicopters have been specifically included in radar departures by incorporating the use of takeoff pads and their accompanying departure courses to establish departure separation.
- (2) Publication of a prototype helicopter chart for the New York terminal area.
- (3) Washington, DC Helicopter Route Chart was published in February 1986.
- (4) Preliminary work on a helicopter route chart for the greater Chicago metropolitan area was completed in April 1987.

### 2. Current Projects Include:

- (1) Development has begun on a "guide" for use by air traffic management and local authorities in conjunction with user groups to use in the development, production, and distribution of site specific helicopter route charts.
- (2) Program evaluating obstructions within helicopter landing areas and en route airspace (see Resume ATO-82-051-M).
- (3) Development of a system to allow for a more expeditious movement of helicopters into, through, within, and between major metropolitan areas in all weather conditions.
- (4) Terminal helicopter instrument procedures (see Resume ATO-82-016-M).
- (5) Interfacing RNAV and other instrument flight rules (IFR) separation criteria to support IFR Loran C operations in the offshore IFR system developed by Houston Air Route Traffic Control Center (see Resume ATO-82-012-M).

3. Future Plans Include:

- (1) Development, where feasible of reduced separation standards resulting from the ongoing wake vortex studies.
- (2) Development of a system to:
  - a. Bring helicopters from the en route IFR environment down to visual condition to allow ingress into the major metropolitan areas on a noninterfering basis.
  - b. Allow helicopters to egress major metropolitan areas in visual conditions and proceed to a point in space where they can enter the en route IFR environment.
  - c. Facilitate the intra and inter city movement of helicopters in visual conditions.

4. Problem/Needs and Actions Being Taken:

There is a need for continued wake turbulence studies to determine the limits of separation of rotorcraft from each other and from fixed-wing aircraft.

5. Agency Obligations/Responsibilities to Provide for Rotorcraft—What and How to Improve Support:

- (1) Rotorcraft capabilities have been addressed with regard to operating rules and air traffic control procedures. Nonetheless, requests or plans for routes, airspace, etc., designed specifically for rotorcraft operations should be thoroughly examined. It would be costly and counterproductive to design a separate or unique system for rotorcraft without first determining that a common national air space cannot accommodate rotorcraft activities.
- (2) The results of the wake turbulence studies will also have an impact on rotorcraft operations, both in the en route and terminal phases of operations.

N	H	C	<u>Air Traffic (ATO)</u>
x			* ATO-82-010-M ATS Implementation/Refinement of NAS Plan Tasks
x			ATO-82-011-M Discrete Helicopter Routes
x			ATO-82-012-M Overwater Route Width Reduction and ATC Separation
x	x		ATO-82-013-M Helicopter Separation Standards
x			* ATO-82-014-M Low Altitude Random Routing
x	x		ATO-82-015-M Improved Weather Reporting and Gathering
x			ATO-82-016-M Terminal Area Studies
x	x		* ATO-82-020-M Air Traffic Operations Service (Control Handbook Changes)
x			* ATO-82-030-M Air Traffic Rules
x			* ATO-82-031-M Flight Rules; FAR Part 91, Subpart B
x	x		* ATO-82-032-M Special Air Traffic Rules and Airport Traffic Patterns; FAR Part 93
x	x		* ATO-82-040-M Airport/Heliport Airspace Analysis
x	x		* ATO-82-050-M Obstruction Evaluation
x	x		ATO-82-051-M Obstruction Marking, Lighting, and Detection
x			* ATO-82-060-M Publications
x	x		* ATO-82-061-M Airport/Facility Directory
x			ATO-82-070-M National Airspace Review Enhancement (NARE)
x			* ATO-82-080-M Air Traffic Control

AVS RESUME

ATO-82-010-M

-----  
PROJECT TITLE: ATS IMPLEMENTATION/REFINEMENT OF NAS PLAN TASKS  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIR TRAFFIC PROGRAM  
-----

RESUME DATE: 01/06/87 LAST REVISION: 06/22/87 REACTIVATED:

-----  
STAFF: PRINCIPAL SPECIALIST: VANDEL, BOB, ATO-329 (202) 267-9340 \*  
TEAM LEADER :  
WRITER/EDITOR :  
-----

OBJECTIVE: TO INTEGRATE PRESENT AND FUTURE ROTORCRAFT PROCEDURES AND  
REGULATORY REQUIREMENTS AND PROJECTS INTO THE NAS PLAN. THIS WILL INCLUDE  
FAR PART 71 COVERING AIRWAYS AND ROUTES.  
-----

REQUIREMENT: TO EVALUATE EACH PROCEDURE AND REQUIREMENT AND DETERMINE  
ITS APPLICABILITY. TO RESPOND TO THE USER NEEDS IN DEVELOPING/REVISING AND  
REFINING THE NAS FOR EFFICIENT HELICOPTER INTEGRATION.  
-----

STATUS: THIS IS A CONTINUING EFFORT  
-----

REMARKS/NOTES: PROJECTS ARE RELATED TO THE DEVELOPMENT AND  
REQUIREMENTS OF THE NAS PLAN.  
-----  
-----



# AVS RESUME

ATO-82-011-M

PROJECT TITLE: DISCRETE HELICOPTER ROUTES  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIR TRAFFIC PROGRAM

RESUME DATE: 01/07/87 LAST REVISION: 06/22/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: BOB VANDELL, ATO-329, (202) 267-9340  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: TO DETERMINE THE APPLICABILITY OF PROVIDING DISCRETE/NON INTERFERING IFR/VFR/SVFR HELICOPTER ROUTES ON A NATIONAL SCALE.

REQUIREMENT: TO DEVELOP AIRSPACE STRUCTURING AND ATC INTERFACE TO DEMONSTRATE THE FEASIBILITY OF OPERATING DISCRETE IFR/VFR HELICOPTER ROUTES. DEVELOPMENT OF HELICOPTER CITY-CENTER AIRWAYS TO ACCOMMODATE IFR HELICOPTER TRAFFIC BETWEEN URBAN AREAS AND MAJOR AIRPORTS, AS WELL AS BETWEEN ADJACENT URBAN AREAS. TO DEVELOP SVFR HELICOPTER SEPARATION CRITERIA BASED ON VISUAL SEPARATION FOR USE IN HIGH DENSITY URBAN AREAS.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
DEV. OF VFR HELICOPTER ROUTE CHART GUIDE	08/31/86	01/30/88	
DEV. OF IFR TIE IN TO VFR ROUTES	12/31/86	10/30/88	
DEV. OF CITY-CTR. TO CITY-CTR. TRANS. CONCEPT	06/30/86	10/30/89	

STATUS: THE HELICOPTER ROUTE CHART "GUIDE" IS BEING DEVELOPED AT THIS TIME. PROJECTED TO BE TO BE PUBLISHED IN JANUARY 1988.

REMARKS/NOTES: RESEARCH AND DEVELOPMENT SCHEDULING IS IDENTIFIED IN RESUMES ADL-82-020-M, ADL-82-040-M, ADL-82-82-060-M, AND ADL-82-070-M. SPECIAL ROUTES STUDY COMPLETION BY ADL IN 1989 WILL IMPACT THE COMPLETION OF CITY-CENTER CORRIDORS. THIS IS A NEW RESUME THAT INCLUDES RESUMES AT-11, NORTHEAST CORRIDOR, AT-13, CITY-CENTER CORRIDORS, AT-14, FAR PART 71, AND AT-15, STAGE III/SPECIAL VFR HELICOPTER OPERATIONS.

AVS RESUME

ATO-82-012-M

PROJECT TITLE: OVERWATER ROUTE WIDTH REDUCTION AND ATC SEPARATION  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIR TRAFFIC PROGRAM

RESUME DATE: 01/08/87 LAST REVISION: 07/10/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: DEAN, WAYNE, ATO-330, (202) 267-9320  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: TO DETERMINE THE FEASIBILITY OF CONTROLLING IFR HELICOPTER TRAFFIC IN THE GULF AREA, USING DIRECT RANDOM ROUTES, AND IDENTIFY ANY NEW PROCEDURES AND ATC IMPROVEMENTS REQUIRED TO FACILITATE SUCH OPERATIONS.

REQUIREMENT: TO DEVELOP AN AIR TRAFFIC CONTROL SYSTEM CAPABILITY TO CONTROL TRAFFIC ON DIRECT RANDOM ROUTES WITH AN INCREASING NUMBER OF ROUTE INTERSECTIONS.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
INSTALLATION COMPLETE	/ /		02/25/87*
INITIAL SYSTEM EVALUATION	07/01/87		
SYSTEM FLIGHT INSPECTION	09/15/87		
COMMISSIONING	12/01/87		

STATUS: SYSTEM EVALUATION DELAYED PENDING RESOLUTION OF EQUIPMENT MALFUNCTION.

REMARKS/NOTES: FLIGHT INSPECTION DELAYED UNTIL EDARC IS OPERATIONAL.

PROJECT TITLE: HELICOPTER SEPARATION STANDARDS  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIR TRAFFIC PROGRAM

RESUME DATE: 01/08/87 LAST REVISION: 08/21/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: VANDEL, BOB, ATO-329 (202) 267-9340  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: TO REDUCE AIRSPACE REQUIREMENTS AND ATC SEPARATION STANDARDS FOR HELICOPTER OPERATIONS, PROVIDING BETTER UTILIZATION OF EXISTING AIRSPACE. TO PROVIDE AIR TRAFFIC WITH THE DATA BASE TO DEVELOP IMPROVED CRITERIA FOR HELICOPTER OPERATIONS IN THE NAS. TO DETERMINE IF HELICOPTERS REQUIRE CATEGORIZATION FOR EFFICIENT INTEGRATION INTO THE NAS.

REQUIREMENT: THE EFFECTS OF WAKE TURBULENCE AND WAKE VORTICES ON HELICOPTERS MUST BE RESEARCHED AND AIRSPACE SEPARATION ADJUSTED ACCORDINGLY. TOOLS AND TECHNIQUES ARE NEEDED TO DEVELOP ADEQUATE PROCEDURES FOR EFFICIENT INTEGRATION OF THE HELICOPTER INTO THE NAS. MINIMUM SEPARATION STANDARDS FOR HELICOPTER TO HELICOPTER AND HELICOPTER TO FIXED-WING MUST BE DETERMINED FOR THE ENROUTE AND TERMINAL AREAS.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
EFFECT OF VORTEX IN FXD-WING AIR. FOLLOW HELI.	05/30/88		
EFFECT OF VORTEX HELI. FOLLOW FXD-WING AIR	08/31/88		
VORTEX IN HELICOPTERS FOLLOWING HELICOPTERS	08/31/88		
EFFECT OF VORTEX IN DOWNWASH/OUTWASH STUDIES	/ /		05/31/86

STATUS: WAKE TURBULENCE TESTING IS BEING CONDUCTED. SLIPPAGE WAS DUE TO INSUFFICIENT FUNDING.

REMARKS/NOTES: THE PROJECT IS BEING CONDUCTED BY ADL (SEE ADL-82-020-M, ADL-82-040-M, ADL-82-060-M, AND ADL-82-070-M. THE OFFICE OF SYSTEMS ENGINEERING IS REVIEWING RADAR RESOLUTION ACCURACY TO DETERMINE IF THE REDUCED SEPARATION STANDARDS AS RECOMMENDED BY NAR TG 2-4.1 ARE FEASIBLE. THIS RESUME INCORPORATES RESUME AT-15, SEPARATION STANDARDS, AND RESUME AT-23, HELICOPTER SEPARATION CRITERIA/AIRCRAFT CATEGORIES FROM THE 1984 ROTORCRAFT MASTER PLAN.

PROJECT TITLE: LOW ALTITUDE RANDOM ROUTING  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIR TRAFFIC PROGRAM

RESUME DATE: 01/08/87 LAST REVISION: 06/23/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: VANDEL, BOB, ATO-329 (202) 267-9340 \*  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: TO ALLOW HELICOPTERS TO OPERATE IN INSTRUMENT METEOROLOGICAL CONDITIONS (IMC) WITH COMPARABLE PERFORMANCE AS UNDER VISUAL METEOROLOGICAL CONDITIONS (VMC). TO PROVIDE ADEQUATE SURVEILLANCE OF LOW ALTITUDES, BEYOND RADAR COVERAGE, FOR HELICOPTER OPERATIONS THROUGHOUT THE U.S.

REQUIREMENT: TO PROVIDE ATC TECHNIQUES AND PROCEDURES THAT WILL ALLOW HELICOPTERS TO OPERATE BELOW OR BEYOND RADAR COVERAGE AT LOW ALTITUDES. THIS NECESSITATES THE ABILITY TO PROVIDE FOR LOW ALTITUDE TRACKING AND RECEIPT OF THE HELICOPTER'S POSITION VIA DATA LINK AND ULTIMATE PROCESSING OF DATA FOR FULL ATC RANGE OF SERVICES (DIRECT, RANDOM ROUTING AT LOW ALTITUDES) UNDER THE ADVANCED AUTOMATION.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
DEFINE ATC CONCEPTS-3D/4D GUID. TECHNIQUES	12/31/89		
EVALUATE ATC SYSTEM VIA SIMULATION	12/31/90		
LOW ALT. COM/NAV/SURV IMPROVEMENTS DEFINED	12/31/85	08/31/89	*
COMPLETE REQUIRED SYSTEMS DEVELOPMENT	12/31/92		
COMPLETE IMPLEMENTATION	12/31/95		

STATUS: THERE ARE CURRENTLY PROCEDURES IN EFFECT FOR USE BY \*  
CONTROLLERS TO HANDLE LOW-ALTITUDE RANDOM ROUTING. THIS RESUME IS BEING \*  
RETAINED IN THIS EDITION FOR ACCOUNTABILITY. IT WILL BE DELETED IN THE \*  
NEXT EDITION. \*

REMARKS/NOTES: R&D FUNDS HAVE BEEN IDENTIFIED IN RESUMES ADL-82-020-M, \*  
ADL-82-040-M, ADL-82-060-M, AND ADL-82-070-M. DEVELOPMENT IS DEPENDENT \*  
UPON COOPERATIVE INDUSTRY AND FAA COMMITMENT. ADL IS INVESTIGATING THE \*  
USE OF LOW COST MODE S-BASED INTERROGRATORS TO AUGMENT THE SECONDARY \*  
SURVEILLANCE NETWORK. THIS RESUME REPLACES RESUME AT-16, LOW ALTITUDE \*  
RANDOM ROUTING FROM THE 1984 ROTORCRAFT MASTER PLAN. \*

# AVS RESUME

ATO-82-015-M

PROJECT TITLE: IMPROVED WEATHER REPORTING AND GATHERING  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIR TRAFFIC PROGRAM

RESUME DATE: 01/08/87 LAST REVISION: 06/23/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: ADAMS, HARRY, ATO-360 (202) 267-9344 \*  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: TO PROVIDE REAL-TIME WEATHER DIRECTLY TO THE HELICOPTER PILOT BY UTILIZING IMPROVED AUTOMATED WEATHER AND SHORT-TERM FORECAST PROCEDURES.

REQUIREMENT: DEVELOP THE TECHNIQUES FOR AUTOMATICALLY GATHERING AND DISSEMINATING LOCAL AND ENROUTE WEATHER VIA DATA LINK DIRECTLY TO THE COCKPIT. DEVELOP SMALL, LOW-COST WEATHER OBSERVATION SYSTEM FOR HELIPORTS.

MILESTONE SCHEDULE COMPLETION DATES: SCHED. REVISED ACTUAL

IMPROVED WEATHER DISSEMINATION 12/31/88

STATUS: PROJECT WAS COMMENCED IN 1984. AWOS DEMONSTRATION UNITS WERE INSTALLED AT THE FAA TECHNICAL CENTER AND THE INDIANAPOLIS HELIPORT IN 1985.

REMARKS/NOTES: NATIONAL PROTOTYPE DEMONSTRATION HELIPORTS WILL RECEIVE AUTOMATIC WEATHER OBSERVATION SYSTEMS (AWOS). NEW ORLEANS HELIPORT IS PROGRAMMED TO RECEIVE AWOS IN THE NEAR FUTURE. THIS RESUME REPLACES RESUME AT-17, IMPROVED WEATHER REPORTING AND GATHERING FROM THE 1984 ROTORCRAFT MASTER PLAN.

AVS RESUME

ATO-82-016-M

PROJECT TITLE: TERMINAL AREA STUDIES  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIR TRAFFIC PROGRAM

RESUME DATE: 01/08/87 LAST REVISION: 07/10/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: VANDEL, BOB, ATO-329 (202) 267-9340 \*  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: TO COLLECT NAS/HELICOPTER PERFORMANCE DATA IN ORDER TO DEVELOP IMPROVED ATC PROCEDURES FOR BETTER INTEGRATION OF THE HELICOPTER IN TERMINAL AREAS INCLUDING CITY-CENTER HELIPORTS. THESE PROCEDURES WILL BE ABLE TO HANDLE A VARIETY OF NAVIGATION AND APPROACH SYSTEMS.

REQUIREMENT: TERMINAL AREA AIRSPACE, INCLUDING CITY-CENTER HELIPORTS, MUST BE REEVALUATED AND/OR REDESIGNED TO ACCOMMODATE HELICOPTERS BY DEVELOPING NEW PROCEDURES AND CRITERIA TO HANDLE THE LOWER SPEEDS, STEEPER DESCENTS, AND IMPROVED INSTRUMENT CAPABILITIES OF THE NEWER ROTORCRAFT.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
TERMINAL ATC STUDIES	12/31/86	12/31/88	*

STATUS: STUDY WAS STARTED IN 1984. SIMULATIONS TO FOLLOW AIRSPACE AND PROCEDURES STUDY.

REMARKS/NOTES: SEE RESUMES ADL-82-020-M, ADL-82-040-M, ADL-82-060-M, AND ADL-82-070-M.

AVS RESUME

ATO-82-020-M

PROJECT TITLE: AIR TRAFFIC OPERATIONS SERVICE  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIR TRAFFIC PROGRAM

RESUME DATE: 01/08/87 LAST REVISION: 06/23/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: VANDEL, BOB, ATO-329 (202) 267-9340 \*  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: TO IMPROVE THE EFFICIENCY OF THE NAS BY PUBLISHING CHANGES  
TO THE AIR TRAFFIC CONTROL HANDBOOK, 7110.65. DEVELOP, COORDINATE, REVIEW, \*  
AND CIRCULATE INFORMATION FOR USE BY AIR TRAFFIC CONTROL PERSONNEL AND  
PRIVATE INDUSTRY WITH RESPECT TO ROTORCRAFT IN THE NAS.

REQUIREMENT: THE COMPLEXITY OF OPERATIONS AND THE AIRCRAFT PILOT  
REQUIREMENTS DEMAND THAT PILOTS AND CONTROLLERS BE AWARE OF THE OPERATIONAL  
REQUIREMENTS OF THE NAS REGARDING ROTORCRAFT.

STATUS: THIS A CONTINUING EFFORT.

REMARKS/NOTES: KEY FACTORS ARE FUNDING AND THE NECESSARY R&D TO DEVELOP  
ADEQUATE CRITERIA.

AVS RESUME

ATO-82-030-M

PROJECT TITLE: AIR TRAFFIC RULES  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIR TRAFFIC PROGRAM

RESUME DATE: 01/13/87 LAST REVISION: 06/23/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: VANDEL, BOB, ATO-329 (202) 267-9340 \*  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: UNDERTAKE, AS NECESSARY, REGULATORY ACTIONS DESIGNED TO  
IMPROVE THE OPERATION OF AIRCRAFT IN THE NAVIGABLE AIRSPACE.

REQUIREMENT: METHODOLOGY AND TOOLS ARE NEEDED TO DEVELOP EFFICIENT  
PROCEDURES AND CRITERIA FOR CONTROL OF ROTORCRAFT.

STATUS: THIS IS A CONTINUING EFFORT. \*

REMARKS/NOTES: USER NEEDS AND IMPROVED TECHNOLOGY IMPACT ON THE  
DEVELOPMENT OF ATC REGULATIONS.



# AVS RESUME

ATO-82-031-M

PROJECT TITLE: FLIGHT RULES, FAR PART 91, SUBPART B  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIR TRAFFIC PROGRAM

-----9m(5)jj-----

RESUME DATE: 01/09/87 LAST REVISION: 08/21/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: VANDEL, BOB, ATO-329 (202) 267-9340  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: DEVELOP RULES TO IMPROVE THE LEVEL OF SAFETY AND MEET THE  
NEEDS OF ROTORCRAFT OPERATIONS IN THE NAS. UNDERTAKE, AS NECESSARY,  
REGULATORY ACTIONS DESIGNED TO IMPROVE THE OPERATION OF AIRCRAFT IN THE NAS.

REQUIREMENT: EXISTING FLIGHT RULES MAY BE TOO RESTRICTIVE OR INADEQUATE  
FOR FUTURE ROTORCRAFT OPERATIONS, E.G., MINIMUM FLIGHT VISIBILITY FOR  
VISUAL OPERATIONS, RIGHT-OF-WAY RULES, IFR OPERATIONS, ETC.

STATUS: THIS IS A CONTINUING EFFORT. RULE DEVELOPMENT IS ONGOING.

REMARKS/NOTES: PROJECT ACTIVITY IS DEPENDENT UPON USER NEEDS, IMPROVED  
TECHNOLOGY, AND ROTORCRAFT IMPROVEMENTS. \*

AVS RESUME

ATO-82-032-M

PROJECT TITLE: SPECIAL AIR TRAFFIC RULES AND AIRPORT TRAFFIC PATTERNS,  
FAR PART 93

PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIR TRAFFIC PROGRAM

RESUME DATE: 01/09/87

LAST REVISION: 06/24/87

REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: VANDEL, BOB, ATO-329 (202) 267-9340 \*

TEAM LEADER :

WRITER/EDITOR :

OBJECTIVE: ENSURE SAFETY OF ROTORCRAFT OPERATIONS IN UNIQUE AIR  
TRAFFIC SITUATIONS WHERE GENERAL FLIGHT RULES ARE INADEQUATE.

REQUIREMENT: CERTAIN UNIQUE TRAFFIC SITUATIONS, E.G., PROXIMITY OF  
AIRPORTS/HELIPORTS, CONCENTRATION OF OPERATIONS, ETC., ARE NOT PROVIDED FOR  
IN THE GENERAL FLIGHT RULES.

STATUS: THIS IS A CONTINUING EFFORT.

REMARKS/NOTES: PROJECT ACTIVITY DEPENDENT UPON DETERMINATION OF SITUATIONS  
THAT REQUIRE REGULATORY ACTION.

AVS RESUME

ATO-82-040-M

PROJECT TITLE: AIRPORT/HELIPORT AIRSPACE ANALYSIS  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIR TRAFFIC PROGRAM

RESUME DATE: 01/12/87 LAST REVISION: 06/24/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: VANDEL, BOB, ATO-329 (202) 267-9340 \*  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: ENSURE THE SAFETY OF AIRCRAFT AND THE EFFICIENT USE OF NAVIGABLE AIRSPACE BY PROVIDING TECHNICAL METHODOLOGIES AND THE DATA BASE TO INTEGRATE HELICOPTERS INTO THE NAS. SUPPORT THE NATIONAL PROTOTYPE HELIPORT PROGRAM.

REQUIREMENT: PROPOSED AIRPORTS/HELIPORTS CAN CONFLICT WITH THE AIRSPACE USED BY AIRCRAFT OR OTHER LANDING AREAS. AN AIRSPACE ANALYSIS MUST BE PERFORMED TO DETERMINE THE EFFECT OF SUCH PROPOSALS ON THE NAS.

STATUS: THIS IS A CONTINUING EFFORT.

REMARKS/NOTES: PROGRAM WILL BE IMPACTED BY AN INCREASE IN THE RATE OF PROPOSED HELIPORT ESTABLISHMENTS. SEE RESUME NOS. ADL-82-010-M AND ADL-82-020-M. HELIPORT PLANNING AND DESIGN CRITERIA IN RESUME ADL-82-080-M IS ONE PROGRAM THAT IS UNDERWAY IN THIS AREA. \*  
\*  
\*

AVS RESUME

ATO-82-050-M

PROJECT TITLE: OBSTRUCTION EVALUATION  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIR TRAFFIC PROGRAM

RESUME DATE: 01/12/87 LAST REVISION: 06/24/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: VANDEL, BOB, ATO-329 (202) 267-9340 \*  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: ENSURE THE SAFETY OF AIRCRAFT AND THE EFFICIENT USE OF  
NAVIGABLE AIRSPACE BY IDENTIFYING OBSTRUCTIONS THAT INTRUDE INTO THE NAS.

REQUIREMENT: CONSTRUCTION OR ALTERATION OF OBJECTS CAN EXCEED THE  
OBSTRUCTION STANDARDS ESTABLISHED BY THE FAA, PENETRATE THE AIRSPACE USED BY  
AIRCRAFT, AND BE HAZARDOUS TO AIR NAVIGATION UNLESS AN AERONAUTICAL STUDY  
DETERMINES OTHERWISE. THOSE OBJECTS THAT PENETRATE THE AIRSPACE MUST BE  
MODIFIED AND/OR REMOVED IN ORDER TO MAINTAIN THE SAFETY OF THE SYSTEM.

STATUS: THIS IS A CONTINUING EFFORT.

REMARKS/NOTES: INCREASING NUMBERS OF HELIPORTS WILL RESULT IN A  
CORRESPONDING INCREASE IN PROJECT ACTIVITY.

# AVS RESUME

ATO-82-051-M

PROJECT TITLE: OBSTRUCTION MARKING, LIGHTING, AND DETECTION  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIR TRAFFIC PROGRAM

RESUME DATE: 01/12/87 LAST REVISION: 07/10/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: VANDEL, BOB, ATO-329 (202) 267-9340  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: TO PROVIDE THE MOST EFFECTIVE MEANS OF INDICATING THE  
PRESENCE OF OBSTRUCTIONS TO PILOTS BY DEVELOPING MINIMUM STANDARDS FOR  
MARKING AND LIGHTING TO ENSURE AN ADEQUATE LEVEL OF CONSPICUITY.

REQUIREMENT: OBSTRUCTIONS ARE OFTEN DIFFICULT TO SEE DURING DAYLIGHT,  
E.G., BROADCAST ANTENNAS, TRANSMISSION LINES, ETC., ESPECIALLY IN LOW  
VISIBILITY CONDITIONS AND IMPOSSIBLE TO SEE AT NIGHT UNLESS MADE  
CONSPICUOUS. MARKING AND LIGHTING STANDARDS HAVE BEEN DEVELOPED; HOWEVER,  
IMPROVEMENT IN ENHANCING THE CONSPICUITY OF OVERHEAD WIRES IS DESIRABLE.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
DEVELOP A PROJECT PROGRAM	06/30/90		
EVALUATION AND ANALYSIS	03/31/91		

STATUS: OFFICE OF PROGRAM AND ENGINEERING MAINTENANCE SERVICE IS  
DEVELOPING THE PROJECT PROGRAM FOR OBSTRUCTION AVOIDANCE.

REMARKS/NOTES: RESUME ATO-82-051-M IS DEPENDENT ON COMPLETION OF WORK IN  
RESUME ADL-83-120-M. DUE TO LIMITED RESOURCES IN ADL, THE SCOPE OF ADL'S  
PROJECT IS BEING REEVALUATED. (SEE RESUME ADL-83-120-M.)

AVS RESUME

ATO-82-060-M

PROJECT TITLE: PUBLICATIONS

PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIR TRAFFIC PROGRAM

RESUME DATE: 01/13/87

LAST REVISION: 06/24/87

REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: FELDMAN, ALLEN, ATO-259 (202) 267-9302 \*

TEAM LEADER :

WRITER/EDITOR :

OBJECTIVE: PROVIDE NAVIGATIONAL CHARTS AND AERONAUTICAL INFORMATION  
PUBLICATIONS ESSENTIAL TO FLIGHT PLANNING AND NAVIGATION.

REQUIREMENT: INCREASING ROTORCRAFT OPERATIONS WILL GENERATE THE NEED FOR  
CHARTS AND PUBLICATIONS TO DEPICT ROUTES AND PROVIDE INFORMATION ON  
LANDING AREAS.

STATUS: PRELIMINARY WORK ON HELICOPTER ROUTE CHART FOR GREATER \*  
CHICAGO METROPOLITAN AREA WAS COMPLETED IN APRIL 1987. \*

REMARKS/NOTES: THE ACTIVITY IN THIS RESUME IS DEMAND GENERATED, AND IT \*  
CANNOT BE QUANTIFIED. \*

AVS RESUME

ATO-82-061-M

-----  
PROJECT TITLE: AIRPORT/FACILITY DIRECTORY  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIR TRAFFIC PROGRAM  
-----

RESUME DATE: 01/13/87 LAST REVISION: 06/25/87 REACTIVATED:

-----  
STAFF: PRINCIPAL SPECIALIST: VANDEL, BOB, ATO-329 (202) 267-9340  
TEAM LEADER :  
WRITER/EDITOR :  
-----

OBJECTIVE: PUBLISH INFORMATION ON SERVICES, FACILITIES, ETC.,  
FOR ALL HELIPORTS OPEN FOR PUBLIC USE.  
-----

REQUIREMENT: EXPAND AIRCRAFT FACILITY DIRECTORY TO INCLUDE A TEXTUAL  
DESCRIPTION AND SCHEMATIC FOR HELIPORTS SHOWN ON VISUAL FLIGHT RULES CHARTS.  
-----

STATUS: THIS IS A CONTINUING EFFORT.  
-----

REMARKS/NOTES: NATIONAL AIRSPACE REVIEW TASK GROUP 2-4.3 ON HELICOPTER  
CHARTS RECOMMENDED THAT THE AIRPORT/FACILITY DIRECTORY HELIPORT SECTION  
INCLUDE A TEXTUAL DESCRIPTION AND SCHEMATIC FOR HELIPORTS SHOWN ON VFR  
CHARTS.  
-----  
-----

# AVS RESUME

ATO-82-070-M

PROJECT TITLE: NATIONAL AIRSPACE REVIEW ENHANCEMENT (NARE)  
PROJECT CATEGORY: ROTOCRAFT MASTER PLAN AIR TRAFFIC PROGRAM

RESUME DATE: 01/13/87 LAST REVISION: 08/18/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: VANDEL, BOB, ATO-329 (202) 267-9340  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: IDENTIFY AND IMPLEMENT CHANGES TO PROMOTE GREATER EFFICIENCY FOR AIRSPACE USERS, SIMPLIFY THE ATC SYSTEM, AND MATCH AIRSPACE AND AIR TRAFFIC CONTROL TO TECHNOLOGICAL IMPROVEMENTS.

REQUIREMENT: IDENTIFY AND IMPLEMENT RECOMMENDATIONS RELATED TO THE UNIQUE CAPABILITIES AND REQUIREMENTS OF ROTOCRAFT.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
NAR RECOMMENDATIONS	12/31/88		
INITIATION OF NAR ENHANCEMENT PROGRAM	04/30/88		
NAR AND NARE INTEGRATION	12/31/90		

STATUS: THIS IS A CONTINUING EFFORT.

REMARKS/NOTES: INDUSTRY PARTICIPATES IN NARE TASK GROUPS. COST/BENEFIT UTILITY OF RECOMMENDATIONS IS REVIEWED BY THE FAA PRIOR TO IMPLEMENTATION. REGULATORY PROCESS COULD POSE A DELAY IN IMPLEMENTATION IN NAR AND NARE RECOMMENDATIONS.



AVS RESUME

ATO-82-080-M

-----  
PROJECT TITLE: AIR TRAFFIC CONTROL  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIR TRAFFIC PROGRAM  
-----

RESUME DATE: 01/13/87 LAST REVISION: 06/25/87 REACTIVATED:

-----  
STAFF: PRINCIPAL SPECIALIST: VANDEL, BOB, ATO-329 (202) 267-9340 \*  
TEAM LEADER :  
WRITER/EDITOR :  
-----

OBJECTIVE: TO PROVIDE FOR SAFE AND EFFICIENT MANAGEMENT OF CIVIL AND  
MILITARY AIR TRAFFIC IN THE NAVIGABLE AIRSPACE.  
-----

REQUIREMENT: TO APPLY POLICIES, PROGRAMS, REGULATIONS, STANDARDS, AND  
PROCEDURES FOR SEPARATION AND CONTROL OF, AND FLIGHT ASSISTANCE TO, AIR  
TRAFFIC.  
-----

STATUS: THIS IS A CONTINUING EFFORT.  
-----  
-----

# **AVIATION STANDARDS PROGRAMS**

## AVIATION STANDARDS SUMMARY

### 1. Major Accomplishments Include:

- (1) Formal dedication ceremonies for the Indianapolis Downtown Heliport were held on May 9, 1985. Indianapolis is the first of the Nation's downtown public-use heliports under the FAA/Industry National Prototype Heliport Demonstration and Development Program.
- (2) Formal dedication ceremonies for the second downtown public-use heliport, New Orleans Downtown Heliport, under the FAA/Industry National Prototype Heliport Demonstration and Development Program were held on January 21, 1986.
- (3) Amended SFAR 38 and Part 121 to require commercial rotorcraft certification and operations to be in accordance with FAR Part 135.
- (4) Granted exemptions to certain operators relieving requirement for 10 hours continuous rest (now 8 hours).
- (5) Developed and implemented lower takeoff minimums for helicopters operating under FAR Part 135.
- (6) Issued national guidance for credit to be granted for required checks and training that has been given in training devices.
- (7) Approved BH-222 and S-76 training devices as acceptable for certain phases of FAR Part 135 Air Taxi training.
- (8) Amended FAR Part 135 so that helicopter certificate holders who use only one pilot are not required to have specific management personnel, training programs, or an operation manual.
- (9) Developed criteria for test program allowing checking credit under FAR Part 135 in helicopter simulators.
- (10) Initiated effort to assess the impact of pilot judgment on rotorcraft accidents (see Resume AVS-83-141-M). Contractor report on helicopter pilot judgment training manual issued in February 1987.
- (11) A Technical Standard Order (TSO-C102) for airborne radar approach systems for helicopters has been developed.
- (12) Developed and implemented airmen written tests to conform with FAR Part 61 (change effective January 6, 1987), SFAR 38.3 for Helicopter ATP, and commercial pilot certificates.

- (13) Developed airmen written test and practical test standards for the recreation pilot helicopter certificate.
- (14) Rotorcraft Regulatory Review No. 5 (Operations and Maintenance) final rule was published in the Federal Register on November 7, 1986, with an effective date of January 6, 1987.

## 2. Current Projects Include:

- (1) Developing helicopter straight-in, steep angle MLS approach criteria for conventional airport sites. Draft criteria have been developed (see Resume AVS-82-020-M).
- (2) A helicopter safety film is in preparation (see Resume AVS-82-040-M).
- (3) Developing the criteria to permit rotorcraft to operate to reduced IFR approach minimums in an airport runway environment (see Resume AVS-84-230-M).
- (4) Developing the criteria to permit rotorcraft to operate to IFR approach to hover and takeoff in a heliport environment (see Resume AVS-84-230-M).
- (5) Developing a pilot judgment training program for helicopter pilots (see Resume AVS-83-141-M).

NOTE: The FAA/Industry National Prototype Heliport has been transferred to the Associate Administrator for Airports. Project resumes are in Chapter 5.

## 3. Future Plans Include:

- (1) To develop/publish MLS curved path approach criteria (see Resume AVS-82-023-M).
- (2) To revise/rewrite Chapter 11 of TERPS (Helicopter Instrument Procedures) for conventional NAVAIDS. Draft copy completed (see Resumes AVS-82-021-M and AVS-82-022-M).
- (3) To consider use of rotorcraft simulators for airman certification (see Resume AVS-83-051-M).

## 4. Agency Obligations/Responsibilities to Provide For Rotorcraft—What and How to Improve Support:

The FAA plans for rotorcraft are: (1) to provide a system that brings helicopters to the level of safety comparable to fixed-wing aircraft; and (2) to provide a system that provides for increased use of the helicopter, especially in all-weather operations.

N	H	C	<u>Aviation Standards (AVS)</u>
		x	* AVS-82-010-M Safety Data Analysis
x	x		AVS-82-020-M Instrument En Route and Terminal Procedures (TERPS)
x	x		AVS-82-021-M TERPS Chapter 11 Lafayette Conventional NAVAIDS
x	x		AVS-82-022-M TERPS Chapter 11 FAA TC Conventional NAVAIDS
x	x		AVS-82-023-M TERPS Chapter 11 Split Site/Collocated MLS
x	x		AVS-82-024-M TERPS Chapter 11 MLS Collocated Site
x	x		AVS-82-025-M TERPS Chapter 11 ARA and HEDA
x	x		AVS-82-026-M TERPS Chapter 11 RNAV
x	x		AVS-82-027-M TERPS Chapter 11 Departure Criteria
x	x		AVS-82-028-M TERPS Chapter 17 En Route RNAV
			AVS-87-029-M Rotorcraft Performance in the Visual Segment
x	x	x	AVS-82-030-M Regulatory Activities—Operations
x			AVS-82-040-M Helicopter Safety Program
x		x	AVS-83-050-M Helicopter Training Device/Simulator Checking Credit to Part 135 Operators
x		x	AVS-83-051-M Rotorcraft Simulator Use in Airman Certification
		x	* AVS-82-090-M Rotorcraft Airmen Certification
x		x	AVS-80-100-M Rotorcraft Regulatory Review Program Notice No. 5 (Operations and Maintenance)
		x	* AVS-82-110-M Engineering Assistance to the Rotorcraft Certification Directorate
		x	* AVS-82-120-M Rotorcraft Manufacturing

\* = Long-term, Continuing Program/Project  
 N = National Airspace System  
 H = Heliports  
 C = Certification

Aviation Standards (AVS)

N	H	C	
		x	* AVS-82-130-M Rotorcraft Maintenance
		x	AVS-82-140-M Rotorcraft Accident Assessment
		x	AVS-83-141-M Rotorcraft Pilot Judgment
		x	AVS-81-150-M Rotorcraft Icing Research
		x	* AVS-84-200-M Rotorcraft Engineering
		x	AVS-85-202-M Rotorcraft Advanced Flight Controls/Display Systems Criteria
		x	AVS-85-203-M Rotorcraft IMC Fully-Coupled Approach/Minimum Equipment Criteria
		x	* AVS-82-210-M Certification and Surveillance of Rotorcraft Operations
x		x	AVS-84-230-M Rotorcraft IFR Approach Minimums
		x	AVS-84-240-M Update of FAA Sikorsky S-76 Helicopter
x		x	AVS-86-250-M Tilt Rotor Aircraft Assessment

AVS RESUME

AVS-82-010-M

PROJECT TITLE: SAFETY DATA ANALYSIS

PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 02/09/87

LAST REVISION: 08/18/87

REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: ELDON JOHNSON

TEAM LEADER : MCLEAN , J

AVN-123 (405)686-4171

WRITER/EDITOR :

OBJECTIVE: TO MAINTAIN A COMPLETE DATA BANK AND IMPROVE SAFETY BY DETERMINING TRENDS BEFORE FURTHER ACCIDENTS, INCIDENTS, OR MECHANICAL DISCREPANCIES OCCUR.

REQUIREMENT: DETECT TRENDS BY ANALYSIS OF ACCIDENT, INCIDENT, AND DISCREPANCY DATA AND DETERMINE AND IDENTIFY CORRECTIVE ACTION FOR ROTORCRAFT SAFETY-RELATED PROBLEMS.

STATUS: THIS IS A CONTINUOUS EFFORT INVOLVING THE MAINTENANCE OF THE ACCIDENT, INCIDENT, AND DIFFICULTY DATA BASES AND THE ANALYSIS OF THE DATA TO IDENTIFY SAFETY RELATED ROTORCRAFT PROBLEMS.

REMARKS/NOTES: MONITOR AND ANALYZE ROTORCRAFT DATA ON A CONTINUOUS BASIS.

AVS RESUME

AVS-82-020-M

PROJECT TITLE: INSTRUMENT ENROUTE & TERMINAL PROCEDURES (TERPS)  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 01/13/87 LAST REVISION: 06/18/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: PATE, DONALD, AVN-210 (405) 686-4164 \*  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: TO DEVELOP, REFINE, AND PUBLISH HELICOPTER ENROUTE AND  
TERMINAL INSTRUMENT PROCEDURES CRITERIA.

REQUIREMENT: TO REVISE EXISTING TERPS AND ASSOCIATED ADVISORY CIRCULARS  
WHERE NECESSARY AND TO DEVELOP NEW CRITERIA WHERE NONE EXISTS, E.G., MLS.

STATUS: IN WORK (CONTINUOUS).

REMARKS/NOTES: SEE RESUME ADL-82-010-M WHICH SUPPORTS RESUME AVS-82-020-M.  
SCHEDULED COMPLETION DATES IN RESUMES AVS-82-021-M THRU AVS-82-028-M REFLECT  
TIME TO PUBLISH CRITERIA IN THE TERMINAL INSTRUMENT PROCEDURES HANDBOOK  
(8360.3).



AVS RESUME

AVS-82-021-M

PROJECT TITLE: TERPS CHAPTER 11 LAFAYETTE CONVENTIONAL NAVAIDS  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 01/13/87 LAST REVISION: 06/19/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: KESSINGER, WILLIAM, AVN-210 (405) 686-4164  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: TO DETERMINE ANY REVISIONS NECESSARY TO THE "OPTIMUM VALUES" CONTAINED IN CHAPTER 11 CRITERIA.

REQUIREMENT: DESIGN "OPTIMUM" HELICOPTER STANDARD INSTRUMENT APPROACH PROCEDURE (SIAPS), FLIGHT CHECK AND TRACK PARTICIPATING USER AIRCRAFT FOR DATA BASE, PERFORM STATISTICAL ANALYSIS AND DETERMINE ADEQUACY OF CURRENT CHAPTER 11 OF TERPS.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
DEVELOP SIAPS	/ /		12/31/83
TRACK HELICOPTERS	/ /		12/31/83
COLLECT STATISTICS AND ANALYSIS OF ILS DATA	/ /		12/31/83
COMPARE TO CH. 11 AND REVISE IF REQUIRED	/ /		02/28/85

STATUS: IN WORK.

REMARKS/NOTES: INITIAL DRAFT OF CHAPTER 11 WAS COORDINATED WITH GOVERNMENT AND INDUSTRY, AND COMMENTS WERE RECEIVED. COMMENTS ARE BEING CONSIDERED AND INCORPORATED WHERE APPROPRIATE. CHANGE TO TERPS DOCUMENT BEING HELD PENDING RESEARCH AND DEVELOPMENT EFFORT TO EVALUATE THE VISUAL SEGMENT OF HELICOPTER INSTRUMENT APPROACHES. MLS COLLOCATED CRITERIA WILL BE PUBLISHED IN A SEPARATE NOTICE. \*

# AVS RESUME

AVS-82-022-M

PROJECT TITLE: TERPS CHAPTER 11 FAATC CONVENTIONAL NAVAIDS  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 01/13/87 LAST REVISION: 06/19/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: KESSINGER, WILLIAM, AVN-210 (405) 686-4164 \*  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: TO DETERMINE ANY REVISIONS NECESSARY TO THE  
"RECOMMENDED MAXIMUM" VALUES CONTAINED IN CHAPTER 11 OF TERPS.

REQUIREMENT: DESIGN "RECOMMENDED MAXIMUM" HELICOPTER SIAPS, FLIGHT CHECK  
AND TRACK AGENCY OWNED/LEASED AIRCRAFT WITH INDUSTRY SUBJECT PILOTS FOR  
DATA BASE, PERFORM STATISTICAL ANALYSIS, AND DETERMINE ADEQUACY OF CURRENT  
CHAPTER 11.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
DEVELOP SIAPS	/ /		12/31/83
TRACK HELICOPTERS	/ /		12/31/83
COLLECT STATISTICS AND ANALYZE	/ /		03/31/84
COMPARE TO CH. 11 AND REVISE IF REQUIRED	/ /		02/28/85

STATUS: IN WORK. THIS RESUME IS CONTINUED IN THIS EDITION FOR \*  
ACCOUNTABILITY ONLY. IT WILL BE DELETED IN THE NEXT EDITION. \*

REMARKS/NOTES: THIS PROJECT WAS COMBINED WITH AVS-82-021-M AND SHOULD NOT \*  
BE TRACKED SEPARATELY. (SEE AVS-82-021-M.) \*

AVS RESUME

AVS-82-023-M

PROJECT TITLE: TERPS CHAPTER 11 SPLIT SITE/COLLOCATED MLS  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 01/13/87 LAST REVISION: 06/19/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: KESSINGER, WILLIAM, AVN-210 (405) 686-4164 \*  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: DEVELOP SPLIT SITE COLLOCATED MLS CRITERIA. \*

REQUIREMENT: DESIGN HELICOPTER STANDARD INSTRUMENT APPROACH PROCEDURES (SIAPS) BASED ON CURRENT HELICOPTER TERPS AND OTHER MLS TERPS PROJECTS USING INDUSTRY PILOTS.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
SIAPS FOR STR. IN/OFFSET/COMPLEX CURVED APP.	/ /		12/31/83
TRACK HELICOPTERS--SPLIT SITE	/ /		12/31/83
TRACK HELICOPTERS--COLLOCATED	/ /		11/30/84
COLLECT STATISTICS AND ANALYZE--SPLIT SITE	/ /		12/31/83
COLLECT STATISTICS AND ANALYZE--COLLOCATED	/ /		03/31/86
DEVELOP DRAFT CRITERIA	/ /		08/30/86
INCORPORATE FINAL CRITERIA INTO NOTICE	09/30/87		
INCORPORATE FINAL CRITERIA INTO TERPS	09/30/85	06/30/91	

STATUS: IN WORK.

REMARKS/NOTES: INITIAL DRAFT OF CHAPTER 11 WAS COORDINATED WITH GOVERNMENT AND INDUSTRY, AND COMMENTS WERE RECEIVED. COMMENTS HAVE BEEN CONSIDERED AND INCORPORATED WHERE APPROPRIATE. HELICOPTER MLS CRITERIA WILL BE ISSUED IN A NOTICE IN FALL 87. FINAL INCORPORATION INTO TERPS WILL OCCUR AFTER COMPLETION OF RESEARCH ON VISUAL SEGMENT OF HELICOPTER INSTRUMENT APPROACH.

AVS RESUME

AVS-82-024-1

PROJECT TITLE: TERPS CHAPTER 11 MLS COLLOCATED SITE  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 01/13/87 LAST REVISION: 08/18/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: KESSINGER, WILLIAM, AVN-210 (405) 686-4164  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: DEVELOP COLLOCATED MLS CRITERIA.

REQUIREMENT: SITE COLLOCATED MLS AT HELIPAD BASED ON FAATC SITING  
DETERMINATION, DESIGN HELICOPTER SIAPS BASED ON CURRENT HELICOPTER TERPS,  
OTHER MLS TERPS, OTHER MLS TERPS PROJECTS, USING INDUSTRY PILOTS.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED. REVISED ACTUAL		
DEFINE SITING REQUIREMENTS	/	/	12/31/83
DESIGN SIAPS FOR STRAIGHT-IN APP. OFFSET APP.	/	/	12/31/83
TRACK HELICOPTERS	/	/	11/30/84
COLLECT STATISTICS AND ANALYZE	05/31/84	02/28/86	02/28/86*
DEVELOP MLS CRITERIA	01/31/85	04/30/87	04/30/87*
COORDINATE AND PUBLISH NOTICE	11/15/87		*
INCORPORATE CRITERIA IN TERPS	11/15/88		*

STATUS: INCORPORATED IN AVS-82-023-M, APRIL 17, 1987.

REMARKS/NOTES: THIS RESUME IS CONTINUED IN THIS EDITION FOR ACCOUNTABILITY  
ONLY. IT WILL BE DELETED IN THE NEXT EDITION.

AVS RESUME

AVS-82-025-M

PROJECT TITLE: TERPS CHAPTER 11 AIRBORNE RADAR APPROACHES-(ARA) \*  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 01/16/87 LAST REVISION: 08/18/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: KESSINGER, WILLIAM, AVN-210 (405) 686-4164  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: TO INCORPORATE AIRBORNE RADAR APPROACHES (ARA) CRITERIA  
IN TERPS AND EXPAND ARA.

REQUIREMENT: REWRITE CRITERIA IN TERPS FORMAT, COORDINATE WITH INDUSTRY  
AND INCORPORATE IN TERPS.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
ARA (REWRITTEN IN TERPS FORMAT)	/ /		01/31/85

STATUS: ON HOLD.

REMARKS/NOTES: PROJECT ON HOLD DUE TO FAA/INDUSTRY WORKING ON NEW ARA/LORAN  
-C OFFSHORE TECHNIQUES FOR APPROACHES TO OFF-SHORE PLATFORMS.--HEDA CRITERIA \*  
IS NO LONGER BEING PURSUED AS ARA AND OFFSHORE STANDARD APPROACH PROCEDURES \*  
(OSAP) PRESENT MUCH GREATER USABILITY. \*

AVS RESUME

AVS-82-026-M

PROJECT TITLE: TERPS CHAPTER 11 RNAV

PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 01/16/87

LAST REVISION: 06/19/87

REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: KESSINGER, WILLIAM, AVN-210 (405) 686-4164 \*

TEAM LEADER :

WRITER/EDITOR :

OBJECTIVE: TO INCORPORATE HELICOPTER RNAV IN TERPS. \*

REQUIREMENT: ADAPT RNAV CRITERIA TO HELICOPTER CHARACTERISTICS, PUT IN TERPS FORMAT, COORDINATE WITH INDUSTRY AND INCORPORATE IN TERPS.

MILESTONE SCHEDULE

COMPLETION DATES: SCHED. REVISED ACTUAL

MODIFY RNAV/TERPS CRITERIA-(TERPS CH. 15)	01/31/85	06/30/86	06/30/86*
COORDINATION OF NEW CRITERIA W/SIGNATOR/USERS	11/30/87		*
PUBLICATION IN TERPS DOCUMENT (CH 15)	03/31/88		*
DRAFT HELICOPTER RNAV CRITERIA	03/31/88		*
COORD. OF HELI. CRITERIA W/SIGNATORIES/USERS	J9/30/88		*
PUBLICATION IN TERPS DOCUMENT (CH 11)	01/31/89		*

STATUS: IN WORK. \*

REMARKS/NOTES: HELICOPTER SPECIFIC CRITERIA WILL CLOSELY FOLLOW PUBLICATION OF RNAV CRITERIA FOR FIXED-WING AIRCRAFT. \*

AVS RESUME

AVS-82-027-M

PROJECT TITLE: TERPS CHAPTER 11, DEPARTURE CRITERIA  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 01/16/87 LAST REVISION: 06/19/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: KESSINGER, WILLIAM, AVN-210 (405) 686-4164 \*  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: DEVELOP HELICOPTER DEPARTURE CRITERIA.

REQUIREMENT: DEVELOP FLIGHT TEST PLAN TO EVALUATE HELICOPTER PERFORMANCE AND TAKE ADVANTAGE OF STEEPER CLIMB GRADIENT AND HELICOPTER PERFORMANCE.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
DEVELOP DEPARTURE CRITERIA NO COURSE GUID.	/ /		09/30/85
DEVELOP DEPARTURE CRITERIA (CONV. NAVAIDS)	/ /		09/30/85
DEVELOP DEPARTURE CRITERIA (MLS)	12/31/85	02/28/86	03/30/86
INCORPORATE INTO CHAPTER 11 (TERPS)	09/30/85	09/30/88	

STATUS: IN WORK.

REMARKS/NOTES: INITIAL DRAFT OF CHAPTER 11 COORDINATED WITH GOVERNMENT AND INDUSTRY, AND COMMENTS WERE RECEIVED (NO COURSE GUIDANCE AND CONVENTIONAL NAVAIDS). COMMENTS ARE BEING CONSIDERED AND INCORPORATED WHERE APPROPRIATE. REVISION TO CHAPTER 11 IS ON HOLD PENDING COMPLETION OF RESEARCH ON THE VISUAL SEGMENT OF HELICOPTER INSTRUMENT APPROACH.

# AVS RESUME

AVN-82-028-M

PROJECT TITLE: TERPS CHAPTER 17 EN ROUTE RNAV  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 01/22/87 LAST REVISION: 08/21/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: KESSINGER, WILLIAM, AVN-210 (405) 686-4164  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: TO INCORPORATE RNAV CRITERIA INTO TERPS.

REQUIREMENT: REWRITE CRITERIA INTO TERPS FORMAT AND INCORPORATE INTO TERPS.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
REWRITE CRITERIA	/ /		03/31/85
CRITERIA INCORPORATED IN TERPS	06/30/86	01/31/87	

STATUS: ON HOLD. A NEW SCHEDULE HAS NOT BEEN DEVELOPED. STATUS \*  
DOES NOT EFFECT USE. \*

REMARKS/NOTES: AC 90-45A, IFR APPROVAL OF AREA NAVIGATION SYSTEMS FOR USE IN THE NATIONAL AIRSPACE SYSTEM, PROVIDES CURRENT CRITERIA. INCORPORATION INTO TERPS DOCUMENT IS BASED UPON PRIORITY WITH OTHER WORK.



# AVS RESUME

AVS-87-029-M

PROJECT TITLE: ROTORCRAFT PERFORMANCE IN THE VISUAL SEGMENT  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 05/06/87 LAST REVISION: 08/21/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: KESSINGER, WILLIAM, AVN-210 (405) 686-4164  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: NEAR-TERM: TO ASSESS THE VIABILITY OF ALLOWING ROTORCRAFT TO EMPLOY SEE-AND-AVOID IN THE VISUAL PORTION OF AN INSTRUMENT APPROACH AS A MEANS OF OBSTACLE AVOIDANCE UNDER THE REDUCED VISIBILITIES ASSOCIATED WITH HELIPORT APPROACH PROCEDURES.  
LONG-TERM: TO QUALIFY AND QUANTIFY ANY SEE-AND AVOID CAPABILITY REALIZED FOR APPLICATION TO TERPS PROTECTIVE SURFACES INSIDE DH ON PRECISION APPROACHES AND TO FLY VISUAL SEGMENT ASSOCIATED WITH NONPRECISION AND POINT-IN-SPACE PROCEDURES.

REQUIREMENT: TO EXPLOIT THE CAPABILITIES OF ROTORCRAFT AND TO PERMIT INDUSTRY TO DEVELOP TO MEET THE DEMANDS OF A MODERN AIR TRANSPORTATION SYSTEM. PROVISIONS MUST BE MADE FOR IFE ARRIVAL AND DEPARTURE TO AND FROM CITY CENTER HELIPORTS WITH A RELIABILITY SIMILAR TO THAT CURRENTLY AVAILABLE FOR FIXED-WING AIRCRAFT.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
START FLIGHT TESTS PHASE 1	10/31/87		*
COMPLETE FLIGHT TESTS PHASE 1	01/31/88		*
COMPLETE SPECIFICATION	07/31/87		*
COMPLETE SCENARIO DEVELOPMENT	06/30/88		*
COMPLETE SIMULATION TESTING	05/31/89		
START FLIGHT TESTS PHASE 2	10/31/89		*
COMPLETE FLIGHT TESTS PHASE 2	03/31/90		*
DRAFT TERPS CHANGE	11/30/90		*
PUBLICATION TERPS DOCUMENT	06/30/91		*

STATUS: IN WORK.

AVS RESUME

AVS-82-030-M

PROJECT TITLE: REGULATORY ACTIVITIES--OPERATIONS  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 01/22/87 LAST REVISION: 08/18/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: CATEY, DAVE, AFS-240, (202) 426-2096  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: TO CREATE, AMEND, MODIFY, OR DELETE FEDERAL AVIATION  
REGULATIONS AS REQUIRED.

REQUIREMENT: TO DEVELOP SPECIFIC RULEMAKING PROJECTS CONSISTENT WITH  
PROGRAM OBJECTIVES.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
SFAR 29-4	/ /		01/31/83
FAR 121.13 (DELETION)	01/01/99		
FAR 127 (REVOCATION)	01/01/99		
SFAR 38-1 (FEDERAL REGISTER NOTICE)	/ /		06/07/85

STATUS: SFAR 38-2 IS IN EFFECT. SFAR 38-4 IS IN PROCESS TO  
EXTEND EFFECTIVITY OF SFAR 38-1 \*

AVS RESUME

AVS-82-040-M

PROJECT TITLE: HELICOPTER SAFETY PROGRAM  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 01/30/87 LAST REVISION: 06/30/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: AARON, SAM, AFS-810, (202) 267-3818  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: TO PRODUCE A FILM THAT WILL REACH HELICOPTER PILOTS ENGAGED  
IN EXTERNAL LOAD AND OIL INDUSTRY OPERATIONS AND EDUCATE THEM FOR A  
SAFER OPERATION.

REQUIREMENT: TO ESTABLISH FUNDING AND FILM FOOTAGE FOR THE PROJECTS.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
HELICOPTER FILM	03/31/85	04/30/86	

STATUS: NO FUNDING AVAILABLE. NO ESTIMATED COMPLETION DATE CAN  
BE ESTIMATED. \*

REMARKS/NOTES: THE SLIPPAGE IN MILESTONE SCHEDULE IS DUE TO OTHER  
FUNDING PRIORITIES.

AVS RESUME

AVS-83-050-M

PROJECT TITLE: HELICOPTER TRAINING DEVICE/SIMULATOR CHECKING CREDIT TO  
PART 135 OPERATORS

PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 05/06/87 LAST REVISION: 06/30/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: COOPER, FREDDIE, AFS-250 (202) 267-3771 \*  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: TO PROVIDE TIMELY RELIEF TO PART 135 CERTIFICATE HOLDERS  
INVOLVING HELICOPTER OPERATIONS BY EXTENDING CHECKING CREDITS USING CURRENT  
STATE-OF-THE-ART TRAINING DEVICES/SIMULATORS.

REQUIREMENT: ESTABLISH HELICOPTER SIMULATOR REQUIREMENTS, IDENTIFY  
AREAS TO CHECK FOR PROPER PILOT EVALUATIONS, AND PROVIDE IMMEDIATE INTERIM  
RELIEF.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
DEVELOP INTERIM RELIEF PACKAGE	/ /		04/30/83
ESTABLISH HELICOPTER SIMULATOR REQUIREMENTS	/ /		05/31/83
INDUSTRY'S SUBMISSION OF TEST GUIDE	/ /		11/30/84
SIMULATION TEAM EVALUATION	/ /		01/31/85
PUBLISH CRITERIA FOR INTERIM RELIEF	/ /		07/31/85

STATUS: NONE. \*

REMARKS/NOTES: INDUSTRY'S SUBMISSION OF TEST GUIDE WAS BASED ON TEST  
CRITERIA. ACTION NOTICE WILL BE DEVELOPED.

AVS RESUME

AVS-83-051-M

PROJECT TITLE: ROTORCRAFT SIMULATOR USE IN AIRMAN CERTIFICATION  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 05/06/87 LAST REVISION: 05/06/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST:  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: IN COORDINATION WITH ROTORCRAFT REGULATORY REVIEW PROGRAM NOTICE NO. 5, PUBLISH APPENDIX B OF PART 61 LISTING THE PRACTICAL TEST REQUIREMENTS FOR AIRLINE TRANSPORT PILOT CERTIFICATES AND ASSOCIATED TYPE RATINGS IN ROTORCRAFT AND OBJECTIVELY MATCH THESE REQUIREMENTS WITH A CATALOG OF SIMULATION DEVICES. THIS AMENDMENT SHOULD EXTEND THE MAXIMUM CREDIT TO SIMULATION DEVICES THAT OBJECTIVE REQUIREMENTS WILL PERMIT.

REQUIREMENT: THIS PROPOSAL ARISES FROM THE NEED IDENTIFIED BY ROTORCRAFT REGULATORY REVIEW PROGRAM NOTICE NO. 5, TO PUBLISH AN APPROPRIATE APPENDIX B TO PART 61 TO ESTABLISH AIRLINE TRANSPORT PILOT CERTIFICATION REQUIREMENTS FOR ROTORCRAFT AND TO PERMIT MAXIMUM USE OF APPROPRIATE ROTORCRAFT SIMULATION DEVICES FOR WHICH THERE IS PRESENTLY NO REGULATORY PROVISION.

STATUS: PROPOSAL STAGE. DECISION TO BE MADE ON INITIATING THIS PROJECT.

REMARKS/NOTES: MILESTONE SCHEDULE IS TO BE DEVELOPED AFTER DECISION TO IMPLEMENT PROJECT AND THE FIRST DRAFT OF THE NPRM RESULTING FROM PROJECT NO. VS-83-105-R, AIRPLANE SIMULATOR USE IN AIRMAN CERTIFICATION.

# AVS RESUME

AVS-82-090-M

PROJECT TITLE: ROTORCRAFT AIRMEN CERTIFICATION  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 01/30/87 LAST REVISION: 05/19/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: FRED LAIRD, AVN-130 (405) 686-4151 \*  
TEAM LEADER : WALKER , G AVN-130 (405) 686-4149  
WRITER/EDITOR :

OBJECTIVE: TO REDUCE THE NUMBER OF ROTORCRAFT AIRMEN-RELATED ACCIDENTS AND INCIDENTS BY UPDATING AIRMEN CERTIFICATION MATERIAL AND TECHNIQUES.

REQUIREMENT: TO REVISE AIRMEN WRITTEN TESTS, PRACTICAL TEST STANDARDS, RELATED HELICOPTER HANDBOOKS, AND OTHER ASSOCIATED AIRMEN CERTIFICATION ADVISORY CIRCULARS.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
AC 61-13B, BASIC HELICOPTER HANDBOOK	12/31/87	12/31/88	
AC 61-27C, INSTRUMENT FLYING HANDBOOK	12/31/88		
FAA-S-8081, HELICOPTER PRACTICAL TEST STDS.	08/01/87		
FAA-T-8080, HELICOPTER WRITTEN TEST BOOK	03/01/88		

STATUS: ALL PROJECTS FALLING BEHIND OR ON HOLD DUE TO PERSONNEL SHORTAGE AND/OR PERSONNEL CUTS, AND LACK OF FUNDS FOR CONTRACTING SPECIFIC PROJECTS.

REMARKS/NOTES: MAXIMUM EFFORT IN THE AREA OF PRACTICAL TEST STANDARDS AND AIRMEN WRITTEN TEST BOOKS IS ONGOING. ADVISORY CIRCULAR HANDBOOKS ARE ON HOLD PENDING FUNDING.

# AVS RESUME

AVS-80-100-M

PROJECT TITLE: ROTORCRAFT REGULATORY REVIEW PROGRAM NOTICE NO. 5  
(OPERATIONS AND MAINTENANCE)  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 01/30/87 LAST REVISION: 06/19/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: CLEMENS, MARIAN, AFS-850, (202) 267-3829  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: THIS IS NOTICE NO. 5 OF A SERIES OF SIX RULES/NOTICES TO BE ISSUED AS PART OF THE FAA'S COMPREHENSIVE ROTORCRAFT REGULATORY REVIEW PROGRAM. THE FAA HAS PREVIOUSLY ISSUED RULE NO. 1 & RULE NO. 2. THESE RULES/NOTICES CONTAIN PROPOSALS WHICH WOULD AMEND AND UPDATE THE OPERATIONS AND MAINTENANCE REQUIREMENTS PERTAINING TO ROTORCRAFT AND COVERED IN PARTS 43, 45, 61, 91, 121, 133, AND 135 OF THE FEDERAL AVIATION REGULATIONS. PART 1 WOULD ALSO BE AMENDED TO ADD A DEFINITION OF A CLASS D ROTORCRAFT-LOAD COMBINATION. THIS NOTICE IS BASED ON A NUMBER OF PROPOSALS DISCUSSED AT THE ROTORCRAFT REGULATORY REVIEW CONFERENCE HELD DECEMBER 10-14, 1979, IN NEW ORLEANS, LA, AND AT THE ROTORCRAFT REGULATORY REVIEW MEETING HELD AUGUST 18-20, 1980, IN WASHINGTON, DC. THESE PROPOSALS OFFER REGULATORY ALTERNATIVES WHICH COULD RESULT IN CHANGES TO PRESENT OPERATIONS AND MAINTENANCE REGULATIONS THAT THE PUBLIC OR THE FAA BELIEVES ARE NECESSARY.

REQUIREMENT: REPEATED REQUESTS FROM THE ROTORCRAFT OWNERS/OPERATORS AND FAA FIELD REPRESENTATIVES TO CHANGE THESE PARTS TO APPLY SPECIFICALLY TO ROTORCRAFT, RATHER THAN TAKING FIXED-WING REGULATIONS AND ARBITRARILY ASSIGNING THEM TO ROTORCRAFT. THIS DEFEATED MANY OF THE INHERENT FUNCTIONAL CHARACTERISTICS OF THE ROTORCRAFT.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
NPRM PUBLISHED IN FEDERAL REGISTER	/ /		03/31/85
FINAL RULE IN FEDERAL REGISTER	08/31/86		11/07/86

STATUS: PROJECT CLOSED. THIS RESUME IS CONTINUED IN THIS EDITION \*  
FOR ACCOUNTABILITY ONLY. IT WILL BE DELETED IN THE NEXT EDITION. \*

REMARKS/NOTES: PUBLISHED IN THE FEDERAL REGISTER NOVEMBER 7, 1986,  
WITH AN EFFECTIVE DATE OF JANUARY 6, 1987.

AVS RESUME

AVS-82-110-M

-----  
PROJECT TITLE: ENGINEERING ASSISTANCE TO THE ROTORCRAFT CERTIFICATION  
DIRECTORATE

PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS  
-----

RESUME DATE: 01/30/87

LAST REVISION: 08/18/87

REACTIVATED:  
-----

STAFF: PRINCIPAL SPECIALIST: SANDERS, B.J. AVN-110 (405) 686-4374

TEAM LEADER : FOX, D

AVN-110 (405) 686-4374

WRITER/EDITOR :  
-----

OBJECTIVE: RESPOND TO ROTORCRAFT CERTIFICATION DIRECTORATE NEEDS  
RELATIVE TO THE SERVICE HISTORY AND PERFORMANCE OF EQUIPMENT.  
-----

REQUIREMENT: TO IDENTIFY, BY ROTORCRAFT MODEL, SYSTEMS WHICH EXHIBIT  
EITHER LONG OR SHORT MEAN TIME BETWEEN FAILURES (MTBF'S). THE REASONS FOR  
THESE TRENDS NEED TO BE KNOWN BY OPERATORS AND MANUFACTURERS AND  
CORRECTIVE ACTION TAKEN IF NECESSARY.  
-----

STATUS: THIS IS A CONTINUOUS EFFORT INVOLVING PROCESSING OF  
MANDATORY FOREIGN SERVICE BULLETINS, REVIEW OF OPERATIONAL HISTORY BY  
ROTORCRAFT MODEL, AND SPECIAL STUDIES OF ROTORCRAFT SYSTEMS.  
-----  
-----



**AVS-82-120-M**

REMARKS/NOTES: THIS IS A CONTINUOUS EFFORT.

AVS RESUME

AVS-82-130-M

PROJECT TITLE: ROTORCRAFT MAINTENANCE  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 01/30/87 LAST REVISION: 06/19/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: RAMAKIS, RAY, AFS-300- (202) 267-3546  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: TO ENSURE CONTINUED AIRWORTHINESS.

REQUIREMENT: TO ENSURE THAT MECHANICS AND MAINTENANCE FACILITIES ARE  
PROPERLY CERTIFICATED AND THAT THEY ADEQUATELY PERFORM THEIR MAINTENANCE  
TASKS.

STATUS: NONE. \*

# AVS RESUME

AVS-82-140-M

PROJECT TITLE: ROTORCRAFT ACCIDENT ASSESSMENT  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 02/03/87 LAST REVISION: 08/18/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: OSTROWSKI, DAVE, AWS-110, (202) 267-9568  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: REDUCTION OF ROTORCRAFT ACCIDENTS

REQUIREMENT: TO ASSESS THE MAJOR BASIC CAUSES OF ROTORCRAFT ACCIDENTS TO DETERMINE THE AREAS WHERE THE MOST EFFECTIVE CORRECTIVE ACTION CAN BE TAKEN CONSISTENT WITH IMPROVING SAFETY WITHOUT UNDUE PUBLIC OR INDUSTRY BURDEN.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
INITIATE OVERALL ASSESSMENT	/ /		09/30/83
IDENTIFY MAJOR BASIC ACCIDENT CAUSES	10/31/83	03/31/86	09/30/86*
START IMPLEMENTING CORRECTIVE ACTION	11/30/83	07/31/86	

STATUS: FINAL REPORT HAS BEEN PREPARED. ACCIDENT CAUSES, REMEDIES \*  
IDENTIFIED. CORRECTIVE ACTION BEING PURSUED THROUGH PROJECT AVS-83-141-M AND \*  
ONGOING ROTORCRAFT AIRWORTHINESS ACTIVITIES IN THE ROTORCRAFT CERTIFICATION \*  
DIRECTORATE. THIS PROJECT IS CANCELED. \*

REMARKS/NOTES: SOME CONTINUING EFFORTS IN THIS AREA ARE SAFETY DATA \*  
ANALYSIS, FOREIGN SERVICE DATA REVIEW, AND ROTORCRAFT DIRECTORATE \*  
REVIEW/ISSUANCE OF AD'S. \*

PROJECT TITLE: ROTORCRAFT PILOT JUDGMENT  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 02/03/87 LAST REVISION: 06/22/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: BARTON, BOB, AFS-820, (202) 267-3827  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: TO ANALYZE DATA ON ROTORCRAFT ACCIDENTS, TO ESTABLISH THE EXTENT AND TYPE OF JUDGMENT ERRORS WHICH RESULT IN ACCIDENTS, AND ADOPT FIXED-WING JUDGMENT TRAINING MATERIALS TO HELICOPTERS.

REQUIREMENT: PILOT ERROR IS A PRIMARY CAUSE OF ROTORCRAFT ACCIDENTS AS WITH FIXED-WING AIRCRAFT. ANALYSIS OF DATA INDICATES THAT OVER HALF SUCH ACCIDENTS ARE DUE TO DEFICIENCIES IN PILOT'S ATTITUDES, RISK ASSESSMENT, OR DECISIONMAKING SKILLS.

MILESTONE SCHEDULE	COMPLETION DATES:	SCHED.	REVISED	ACTUAL
REV E REG & CANADIAN FIXED-WING PRJ RESULTS	/ /			01/31/84
REVIEW ROTORCRAFT ACCIDENT DATA	/ /			01/30/86
MOD FX-WING JUDG TRN MANS TO DEV ROTOR MANS	10/31/84	09/30/86		02/28/87*
TEST ROTORCRAFT MANUALS	06/30/85	11/30/87		*
ISSUE REVISED ROTORCRAFT MANUALS	09/30/85	05/31/88		*

STATUS: THE RESULTS FROM THE FIXED-WING JUDGMENT DEMONSTRATION HAVE BEEN POSITIVE. THE ARMY RESEARCH INSTITUTE AT FT. RUCKER, ALABAMA, IS REVIEWING THE RESULTS WITH A VIEW TOWARD RECOMMENDING A TEST OF HELICOPTER PILOT JUDGMENT TRAINING BE CONDUCTED AT THE ARMY AVIATION SCHOOL.

REMARKS/NOTES: THE ARMY EFFORT WILL BE MONITORED FOR POTENTIAL APPLICATION TO CIVILIAN HELICOPTER PILOT TRAINING. \*

PROJECT TITLE: ROTORCRAFT ICING RESEARCH  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 02/03/87 LAST REVISION: 08/18/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: ADAMS, RICHARD, AWS-104, (202) 257-9586  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: DEVELOP THE TECHNICAL BASIS FOR UPDATE OF ICING CERTIFICATION STANDARDS, PROCEDURES, AND GUIDELINES, AND MAINTAIN EXPERTISE THROUGH RESEARCH IN: (1) ICING ATMOSPHERIC CRITERIA, (2) ICING TEST AND OPERATIONAL TECHNOLOGY, (3) ICE PROTECTION SYSTEM TECHNOLOGY, AND (4) ICING SIMULATION TECHNOLOGY.

REQUIREMENT: AIRCRAFT GROWTH PROJECTIONS, TECHNOLOGY ADVANCEMENTS, CURRENT CERTIFICATION DIFFICULTIES, AND ACCIDENT STATISTICS ARE IN COMBINATION INDICATIVE OF FUTURE ICING CERTIFICATION AND GROUND AND FLIGHT OPERATIONAL PROBLEMS. INDUSTRY HAS CHALLENGED ICING ATMOSPHERIC CRITERIA, EXORBITANT COST AND TIME REQUIRED FOR ICING CERTIFICATION LACK OR OBSOLESCENCE OF DESIGN AND CERTIFICATION GUIDANCE AND THE LACK OF\*

MILESTONE SCHEDULE COMPLETION DATES: SCHED. REVISED ACTUAL

ICING ATMOSPHERIC CRITERIA	12/31/91	12/31/88	
AIRCRAFT ICING HANDBOOK-(CONTRACTOR INPUT)	06/30/86	01/31/88	*
HANDBOOK UPDATES (BIANNUALLY)	06/30/89		

STATUS: CURRENT EFFORTS INCLUDE JOINT FAA/ARMY TESTS, FAA/NASA EFFORTS IN ICING TECHNOLOGY, FAA/DOD/NASA EFFORTS IN ATMOSPHERIC CRITERIA, ONGOING EFFORT IS IN ACCORDANCE WITH FAA TECHNICAL CENTER E&D AIRCRAFT ICING PLAN, DATED 8/83. THE AIRCRAFT ICING CERTIFICATION STEERING GROUP IS\*\*

REMARKS/NOTES: THIS EFFORT WAS INITIATED IN 1978 AS A HELICOPTER ICING RESEARCH PROGRAM AND NOW INCLUDES FIXED-WING AIRCRAFT RESEARCH AS WELL. SIGNIFICANT CONTRIBUTIONS HAVE BEEN MADE TOWARD DEVELOPMENT OF HELICOPTER ICING CERTIFICATION STANDARDS AND PROCEDURES. FAR 27 AND 29 RULES BECAME EFFECTIVE ON 3/2/83. ADVISORY CIRCULAR NO. 29-2 FOR CERTIFICATION OF TRANSPORT CATEGORY ROTORCRAFT BECAME EFFECTIVE ON 5/20/83. SEE RESUME ADL-83-100-M FOR RELATED ICING ACTIVITIES.

\*STANDARDIZATION IN THE AIRCRAFT ICING CERTIFICATION PROCESS. THIS REQUIREMENT INCLUDES ALL AIRCRAFT TYPES (LARGE, SMALL, AND ROTORCRAFT).

\*\*CURRENTLY EMBELLISHING THE SPECIFIC NEED UNDER THESE TWO REGULATORY AND GUIDANCE ORIENTED PROGRAMS.

AVS RESUME

AVS-84-200-M

PROJECT TITLE: ROTORCRAFT ENGINEERING  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 02/03/87 LAST REVISION: 07/10/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: OSTROWSKI, DAVE, AWS-110 (202) 267-9588 \*  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: ASSURE ADEQUATE ROTORCRAFT ENGINEERING SUPPORT FOR  
CERTIFICATION, STANDARDS, AND PROCEDURES.

REQUIREMENT: NEED AT HEADQUARTERS LEVEL TO ASSURE ADEQUATE  
CONSIDERATION OF ROTORCRAFT IN ENGINEERING CERTIFICATION, STANDARDS, AND  
PROCEDURES PERTAINING TO ALL AIRCRAFT. A NATIONAL PERSPECTIVE FOR  
ROTORCRAFT IS APPLIED IN FAR'S, AC'S, TECHNICAL STANDARD ORDERS (TSO), AND  
THE NATIONAL RESOURCE SPECIALIST PROGRAM.

STATUS: CONTINUING EFFORT. \*

# AVS RESUME

AVS-85-202-M

PROJECT TITLE: ROTORCRAFT ADVANCED FLIGHT CONTROLS/DISPLAY SYSTEMS  
 CRITERIA  
 PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 02/03/87 LAST REVISION: 08/18/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: HONAKER, JIM, ASW-111 (817) 624-5109  
 TEAM LEADER :  
 WRITER/EDITOR :

OBJECTIVE: DEVELOP CRITERIA AND GUIDANCE MATERIAL FOR AIRWORTHINESS  
 CERTIFICATION OF ROTORCRAFT ADVANCED FLIGHT CONTROLS/DISPLAY SYSTEMS.

REQUIREMENT: THE SOUTHWEST REGION, AIRCRAFT CERTIFICATION DIVISION (BY  
 LETTER OF MAY 14, 1984, SUBJECT: R&D NEEDS FOR THE PERIOD 1985-1990)  
 IDENTIFIED REQUIREMENTS FOR R&D TO HELP DEVELOP ROTORCRAFT AIRWORTHINESS  
 CERTIFICATION CRITERIA IN 7 AREAS. THIS PROJECT ADDRESSES 3 OF THESE:  
 ROTORCRAFT ADVANCED FLIGHT CONTROLS (I.E., SIDEARM CONTROL/FLY-BY-WIRE),  
 DISPLAYS (E.G., FLIGHT DIRECTORS), AND SENSORS (E.G. FLIR).

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL	
PROJECT PLAN	06/30/85	12/31/87		*
BEGIN PHASE I (FLY-BY-WIRE) DATA COLLECTION	10/31/85	09/30/87		*
FINAL REPORT, PHASE I	10/31/86	06/30/88		*
BEGIN PHASE II (DISPLAYS, ETC.)	09/30/86	06/30/88		*
FINAL REPORT, PHASE II	09/30/87	12/30/88		*
BEGIN PHASE III (SENSORS (FLIR ETC) DATA COLL	03/31/87	04/28/89		*
FINAL REPORT, PHASE III	01/31/88	07/31/90		*

STATUS: PROGRAM DIRECTIVES ESTABLISHED, CANADIAN COOPERATION  
 OBTAINED, IN PROCESS OF DETERMINING NEEDS.

REMARKS/NOTES: SEE RESUME AVS-85-203-M, AVS-84-230-M, AND ADL-82-090-M FOR  
 RELATED EFFORTS.--ASW IS WORKING WITH ANM TO USE ANM STANDARDS DEVELOPED FOR  
 THE AIRBUS 320 FLY-BY-WIRE (FBW) SYSTEM. THIS PROGRAM MAY BE USED TO  
 EVALUATE THESE FBW STANDARDS FOR ROTORCRAFT BEFORE PROCEEDING WITH  
 PHASES II AND III.

PROJECT TITLE: ROTORCRAFT IMC FULLY-COUPLED APPROACH/MINIMUM  
EQUIPMENT CRITERIA  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 02/03/87 LAST REVISION: 08/18/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: HOWAKER, JIM, ASW-111 (817) 624-5109  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: DEVELOP CRITERIA AND GUIDANCE MATERIAL FOR AIRWORTHINESS  
CERTIFICATION OF ROTORCRAFT IMC FULLY-COUPLED APPROACHES AND THE  
ASSOCIATED MINIMUM EQUIPMENT.

REQUIREMENT: THE SOUTHWEST REGION, AIRCRAFT CERTIFICATION DIVISION, (BY  
LETTER OF MAY 14, 1984, SUBJECT: R&D NEEDS FOR THE PERIOD 1985-1990)  
IDENTIFIED REQUIREMENTS FOR R&D TO HELP DEVELOP ROTORCRAFT AIRWORTHINESS  
CERTIFICATION CRITERIA IN 7 AREAS. THIS PROJECT ADDRESSES 2 OF THESE: IMC  
FULLY-COUPLED APPROACH TO A HOVER AND THE ASSOCIATED MINIMUM EQUIPMENT  
REQUIREMENTS.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
PROJECT PLAN	06/30/85	12/31/87	*
BEGIN PHASE I (MIN EQUIP) DATA COLLECTION	03/31/86	09/30/87	*
FINAL REPORT, PHASE I	03/31/87	06/30/88	*
BEGIN PHASE II (COUPLED APPROACH) DATA COLL.	05/31/87	06/30/89	*
FINAL REPORT, PHASE II	08/31/88	08/30/90	*

STATUS: PROGRAM DIRECTIVES ESTABLISHED; CANADIAN COOPERATION  
OBTAINED, IN PROCESS OF DETERMINING NEEDS.

REMARKS/NOTES: SEE RESUMES AVS-85-202-M, AVS-84-230-M, AND ADL-82-090-M  
FOR RELATED EFFORTS.



# AVS RESUME

AVS-82-210-M

-----  
PROJECT TITLE: CERTIFICATION AND SURVEILLANCE OF ROTORCRAFT  
OPERATIONS.

PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS  
-----

RESUME DATE: 02/03/87 LAST REVISION: 06/22/87 REACTIVATED:

-----  
STAFF: PRINCIPAL SPECIALIST: MYRES, RON AFS-820, (202) 267-3828

TEAM LEADER :

WRITER/EDITOR :

-----  
OBJECTIVE: TO PROVIDE CONTINUING SURVEILLANCE AND CERTIFICATION OF THE  
OPERATORS AND PILOTS OF ROTORCRAFT.

-----  
REQUIREMENT: TO MAINTAIN THE LEVEL OF SAFETY SPECIFIED BY THE  
FEDERAL AVIATION REGULATIONS AS THEY RELATE TO THE OPERATION OF  
ROTORCRAFT.

-----  
STATUS: NONE. \*

PROJECT TITLE: ROTORCRAFT IFR APPROACH MINIMUMS  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 02/09/87 LAST REVISION: 05/05/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: DAVIS, JERRY, AFS-200, (202) 267-8452 \*  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: NEAR-TERM: TO DEVELOP THE AIRWORTHINESS AND OPERATIONAL APPROVAL CRITERIA TO PERMIT ROTORCRAFT TO OPERATE TO REDUCED IFR APPROACH MINIMUMS IN AN AIRPORT RUNWAY ENVIRONMENT.  
LONG-TERM: TO DEVELOP THE AIRWORTHINESS AND OPERATIONAL APPROVAL CRITERIA TO PERMIT ROTORCRAFT TO OPERATE TO IFR APPROACH TO HOVER AND TAKEOFF IN A HELIPORT ENVIRONMENT.

REQUIREMENT: IN ORDER TO FULLY UTILIZE THE CAPABILITIES OF ROTORCRAFT AND TO PERMIT INDUSTRY TO DEVELOP THE CAPABILITY TO MEET THE DEMANDS OF A MODERN AIR TRANSPORTATION SYSTEM, PROVISIONS MUST BE MADE FOR IFR LANDINGS AND TAKEOFFS OF ROTORCRAFT SIMILAR TO CAPABILITIES NOW AVAILABLE FOR AIRPLANES.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
NEAR-TERM (CAT IIIA): DRAFT GUIDANCE	/ /		11/30/84
PUBLISH AC IN FEDERAL REGISTER FOR COMMENT	04/30/86	09/30/87	*
ISSUE CAT IIIA AIRWOR. & OPER. APPROVAL CRIT.	11/30/85	06/30/88	*

STATUS: PROGRAM IN PROCESS.

REMARKS/NOTES: KEY PROGRAM CONCEPTS INCLUDE THE SAME LEVEL OF SAFETY AS SIMILAR OPERATIONS WITH AIRPLANES UTILIZING AS MUCH EXISTING CRITERIA AS POSSIBLE, CONSIDERATION OF FULL RANGE OF REQUIREMENTS (INCLUDING AIRBORNE, GROUND, TRAINING, AIRWORTHINESS, ETC.). SUBSEQUENT MILESTONES FOR NEAR-TERM (CAT IIIA) FOLLOWING ISSUANCE OF CRITERIA BY FAA MUST BE INITIATED OUTSIDE FAA. FOR EXAMPLE, PREPARATION OF A PROJECT PLAN FOR THE INITIAL STC WOULD TAKE 90 DAYS FROM RECEIPT OF A REQUEST FROM INDUSTRY. COMPLETION OF THE STC WOULD TAKE AN ADDITIONAL 90 DAYS. THE STC COULD THEN BE ISSUED WITHIN 30 DAYS, AND ISSUING THE FIRST CAT IIIA OPERATIONAL APPROVAL COULD BE DONE WITH AN ADDITIONAL 30 DAYS AND WOULD REQUIRE A REQUEST FROM AN OPERATOR. LONG-TERM (CAT IIIB) MILESTONES WOULD BE SIMILAR TO THOSE FOR CAT IIIA, BUT WOULD BE TO HELIPADS/HELIPORTS VS. RUNWAYS.

AVS RESUME

AVS-84-240-M

PROJECT TITLE: UPDATE OF FAA SIKORSKY S-76 HELICOPTER  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 02/09/87 LAST REVISION: 06/22/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: CONE, ROBERT, AVN-350 (609) 484-4558 \*  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: PROVIDE THE CURRENT STATE-OF-THE-ART AIRCRAFT FOR FAA \*  
HELICOPTER PROGRAMS.

REQUIREMENT: CONDUCT FLIGHT TRAINING FOR FAA PILOTS AND CONDUCT VARIOUS \*  
HELICOPTER PROJECTS AND PROGRAMS IN CURRENT STATE-OF-THE-ART AIRCRAFT \*  
TO MAINTAIN CREDIBILITY IN THE CONDUCT OF HELICOPTER PROGRAMS.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
IDENTIFY BASIC MODIFICATIONS NECESSARY	/ /		06/30/84
INITIATE PROCUREMENT PROCESS TO OBTAIN MODIF.	/ /		09/30/84
AWARD CONTRACT	/ /		03/31/85
INSTALL EFIS & AUTOMATIC FLT. CONTROL SYS.	09/30/86	09/30/87	*

STATUS: EFIS/DEFIS BEING INSTALLED IN VAN NUYS, CALIFORNIA. \*

AVS RESUME

AVS-86-250-11

PROJECT TITLE: TILT ROTOR AIRCRAFT ASSESSMENT  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AVIATION STANDARDS PROGRAMS

RESUME DATE: 02/09/87 LAST REVISION: 08/18/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: OSTROWSKI, DAVE, AWS-110, (202) 267-9588  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: TO DETERMINE THE BENEFITS OF TILT ROTOR AIRCRAFT TO THE NATION.

REQUIREMENT: TILT ROTOR TECHNOLOGY HAS BEEN SUCCESSFULLY DEMONSTRATED WITH THE XV-15 AND WILL BE PUT INTO USE WITH THE MILITARY V-22 OSPREY. THIS MAKES THE POSSIBILITY OF A CIVIL TILT ROTOR AIRCRAFT MUCH GREATER, AND IT IS, THEREFORE, NECESSARY FOR THE FAA TO BE PREPARED TO CERTIFY AND ALLOW FOR OPERATIONS OF THIS TYPE OF AIRCRAFT.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
MEMORANDUM OF AGREEMENT	/ /		10/03/85
CONTRACT AWARD	/ /		04/06/86
TILT ROTOR FORUM	07/30/87		07/30/87*
CONTRACT COMPLETION	05/30/87	10/31/87	
FINAL REPORT	11/30/87		

STATUS: CONTRACT AWARDED. CONTRACTOR DRAFT REPORTS DELIVERED.  
TILT ROTOR FORUM PRESENTED STUDY RESULTS. \*

## ROTORCRAFT CERTIFICATION DIRECTORATE SUMMARY

### 1. Major Accomplishments Include:

- (1) Many rotorcraft were certificated, including single-pilot IFR and combination dual or single IFR certifications. Assisted in certification of many of the SFAR 29 IFR approvals until Rule 1 (with IFR provisions) was released.
- (2) Update of all rotorcraft standards initiated (Rotorcraft Regulatory Review). NPRM 80-25 (NPRM 1) issued; Rule 1 effective 3/3/83 (Certification standards applicability, IFR, Icing). NPRM 2 issued (flight and systems criteria); final rule published 11/30/84, effective date 12/6/84. NPRM 3 for propulsion was published in the Federal Register on November 27, 1984. NPRM 4 for structures is in final processing for coordination and publication.
- (3) AC 29-XX was released in final form on 5/20/83 as an advanced copy of AC 29-2. Government Printing Office copy has been distributed. Change 1 to AC 29-2 was issued 11/19/84. Change 2 to AC 29-2 was issued 5/28/85. The initial issue of AC 27-1 (the comprehensive certification guide for normal category helicopters) was issued 8/29/85. Public meeting to address AC 29-2, Revision 3, and AC 27-1, Revision 1, was held on March 5-6, 1987.
- (4) Aerospatiale SA-365N-1, AS-350B-1, and AS-355F-2 and Sikorsky S-76B certificated.
- (5) Processed 49 Airworthiness Directive actions for both foreign and domestic rotorcraft in FY-86. Worked with operators and manufacturers to obtain flight safety with minimum adverse impact on operations.
- (6) Published NPRM on Transport Rotorcraft Structural Fatigue and Damage Tolerance (FAR 29.571) with associated draft AC 29.571-X. Held second public meeting.
- (7) The first approval for helicopter operation in supercooled icing conditions was issued for the Aerospatiale AS-332 in March 1984.
- (8) Completed and published in the Federal Register, May 1984, a summary of the rotorcraft industry's five highest safety priorities that can be addressed through airworthiness regulations.
- (9) Full Authority Digital Engine Controls (FADEC) have been approved for one helicopter installation and three others have made application. Two of the significant issues were software criticality and lightning strike protection. Advisory material is now provided in Change 2 to AC 29-2 on lightning strike protection.

**ROTORCRAFT  
CERTIFICATION DIRECTORATE PROGRAMS**

- (10) Electronic Flight Instrument System (EFIS)—Use of computer generated CRT displays for flight instruments represents new technology in civil helicopter cockpits. EFIS systems of two different manufacturers have been approved in the Sikorsky Model S-76. One system has been approved in the Bell 412 and another system has been approved in the Westland 30. Advisory material has been prepared with the maximum possible standardization with the transport airplane directorate.
- (11) An ANPRM on Transport Rotorcraft Performance was published, and the NPRM has been drafted and is in coordination.
- (12) The Helicopter Minimum Flightcrew ANPRM was published and a public meeting held. Based on the public meeting, the proposal has been withdrawn.
- (13) Issued an Instrument Flight NPRM proposing a method of reduction of approved instrument approach speed. Public meeting was held to discuss the proposal.
- (14) Developed an NPRM for occupant restraint compatible with information derived from participation with the General Aviation Safety Panel (GASP). The NPRM was published in June 1987. This action was delayed by the necessity for rewriting the economic analysis (see Resume ASW-84-011-M).

## 2. Current Projects Include:

- (1) The continuation of Rotorcraft Regulatory Review (NPRM's 3 and 4) (see Resumes ASW-82-114-M and ASW-82-115-M).
- (2) Continuation of Advisory Circular 29-2 effort (updating and adding additional sections). Plan to complete AC 29-2 to cover all of FAR Part 29 and complete AC 27-1 for all of FAR Part 27 (see Resume ASW-83-020-M).
- (3) A public meeting with participation of domestic and foreign manufacturers and Foreign Airworthiness Authorities was held April 30 through May 2, 1986, to discuss the 92 European Airworthiness Authorities Steering Committee (AASC) proposals for FAR Part 29. The consensus of the meeting was 22 of the proposals have merit for publication as NPRM's. The four projects by specialty area have been combined into one NPRM including all 22 proposals. Also, it was agreed that 16 of the AASC proposals would be best handled as changes or additions to AC 29-2. Any changes will be incorporated by Change 4 to AC 29-2.
- (4) New certification programs: Agusta AS61N1 (Silver); Agusta/Westland EH-101; Bell 400A; Sikorsky CS-70C; S-76 with Turbomeca Arriel 1C1 engines; MBB BK-117A-4 and BO-108; Aero Design Enterprises UH-1; Westland Series 200; Rogerson Hiller RH-1100; Boeing Vertol 360; and Bell 900 Tilt Rotor.

- (5) The Powered Lift Interim Airworthiness Criteria were published and a public meeting was held June 23-26, 1987, to consider issues and to establish working groups as necessary to resolve the issues (see resume ASW-83-014-M).
- (6) Participated in the GASP committee involving fuel crashworthiness and expect to resume some of this rulemaking action that was set aside from the NPRM 3 proposals created by a lack of economic data. The crash resistant fuel systems NPRM scheduled to be published in December 1986 has been delayed by other higher priority work (see Resume ASW-85-113-M).
- (7) An NPRM has been drafted to require containment of turbine engine bursts and was scheduled to be published in late-1986; however, it has been delayed by the time required to develop the basic data for the economic analysis (see Resume ASW-84-111-M).
- (8) Processing Aerospace Industries Association's petition for rulemaking for new one-engine inoperative rating of helicopter engines and resultant improved productivity. An NPRM was scheduled to be published in February 1987; however, it has been delayed by support resources limitations (see Resume ASW-83-018-M).
- (9) Rotorcraft review final rule number 3, for propulsion systems was scheduled to be published in October 1986; however, it has been delayed by support resources limitations (see Resume ASW-82-114-M).
- (10) Rotorcraft review NPRM number 4 was scheduled to be published by February 1986; however, it has been delayed by support resources limitations (see Resume ASW-82-115-M).
- (11) The structural fatigue and damage tolerance NPRM was published and a public meeting was held in March 1987. The final rule will be developed with consideration of comments from the public meeting. An accompanying advisory circular will be published simultaneously (see Resume ASW-82-013-M).
- (12) The Helicopter Instrument Flight NPRM was published and a public meeting was held in March 1987. The final rule will be developed with consideration of comments from the public meeting (see Resume ASW-84-112-M).

### 3. Problems/Needs and Actions Being Taken:

The rotorcraft accident rate needs to be reduced. Each accident is being assessed for possibility of noncompliance with FAR Parts 27 and 29, and corrective action is being initiated with the manufacturers where justified.



The crashworthiness of rotorcraft needs to be improved. Rulemaking projects are in process to increase crashworthiness.

The Directorate is continuing its efforts to coordinate with the JAR 29 group to incorporate their proposals into FAR Part 29. Considerable progress is being made through advisory circulars in guiding and directing foreign manufacturers and airworthiness authorities in methods of compliance with FAR Parts 27 and 29. This effort will assure more uniformity in compliance, fairness, and equal competition for the manufacturers. There are still a number of reserved sections in the advisory circulars. Development of material for these sections is a high priority item.

A member of the Directorate Staff is participating with industry committees and with other directorates to assure cross directorate uniformity in lightning standards. Additional attention to this area is planned as better characterization and methods of protection are developed.

N	H	C	<u>Southwest Region (ASW)</u>	
		x	ASW-82-010-M	Develop Rotorcraft Airworthiness Standards
		x	ASW-84-011-M	Occupant Restraint in Normal and Transport Category Rotorcraft
		x	ASW-84-012-M	Helicopter Minimum Flightcrew
		x	ASW-82-013-M	Transport Rotorcraft Structural Fatigue and Damage Tolerance
		x	ASW-83-014-M	Advanced V/STOL Rotorcraft Standards
		x	ASW-83-016-M	Transport Category Rotorcraft Performance
		x	ASW-83-017-M	Rotorcraft Certification Requirements Coordination with European AASC
		x	ASW-83-018-M	Revised One-Engine-Inoperative (OEI) Power Rating for Rotorcraft
		x	ASW-83-020-M	Rotorcraft Certification Guidance
		x	ASW-82-021-M	Advanced Electronic Helicopter Standards
		x	ASW-82-022-M	Rotorcraft Handling Qualities Assessment
		*	ASW-82-030-M	Rotorcraft Type Certification
		x	ASW-84-111-M	Turbine Burst Protection for Transport Category Helicopters
		x	ASW-84-112-M	Helicopter Instrument Flight
		x	ASW-85-113-M	Crash Resistant Fuel Systems
		x	ASW-82-114-M	Rotorcraft Regulatory Review Program Notice No. 3
			ASW-82-115-M	Regulatory Review Program Notice No. 4 (Airframe)

\* = Long-term, Continuing Program/Project  
 N = National Airspace System  
 H = Heliports  
 C = Certification

AVS RESUME

ASW-82-010-M

-----  
PROJECT TITLE: DEVELOP ROTORCRAFT AIRWORTHINESS STANDARDS  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN CERTIFICATION DIRECTORATE PROGRAMS  
-----

RESUME DATE: 02/10/87      LAST REVISION: 05/21/87      REACTIVATED:

-----  
STAFF: PRINCIPAL SPECIALIST: SHAPLEY, JOHN, ASW-110, (817) 624-5110      \*  
      TEAM LEADER               : PLUMMER, T               ASW-111      (817) 624-5111  
      WRITER/EDITOR            :

-----  
OBJECTIVE:           KEEP FAR PARTS 27 AND 29 CURRENT WITH THE  
STATE-OF-THE-ART IN ROTORCRAFT MATERIALS, SYSTEMS, AND DESIGN TECHNIQUES.  
-----

REQUIREMENT:        PROVIDE A REGULATORY BASIS TO ASSURE EFFICIENT  
CERTIFICATION OF SAFE ROTORCRAFT.  
-----

STATUS:              THIS IS A CONTINUAL PROCESS.  
-----  
-----

AVS RESUME

ASW-84-011-M

PROJECT TITLE: OCCUPANT RESTRAINT IN NORMAL AND TRANSPORT CATEGORY ROTORCRAFT

PROJECT CATEGORY: ROTORCRAFT MASTER PLAN CERTIFICATION DIRECTORATE PROGRAMS

RESUME DATE: 02/10/87 LAST REVISION: 07/01/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: SHAPLEY, JOHN, ASW-110, (817) 624-5110  
 TEAM LEADER : PLUMMER, T ASW-111 (817) 624-5111  
 WRITER/EDITOR : MYERS, D ASW-111 (817) 624-5118 \*  
 MAJOR, J ASW-111 (817) 624-5117

OBJECTIVE: THIS PROJECT PROPOSES CHANGES TO SECTIONS OF PARTS 27 AND 29 AFFECTED BY MINOR CRASH LOADS REVISION. THIS ACTION IS INTENDED TO ESTABLISH OCCUPANT PROTECTION STANDARDS AT A LEVEL CONSISTENT WITH THE PRESENT STATE-OF-THE-ART WITHOUT IMPOSING AN UNREASONABLE ECONOMIC BURDEN ON INDUSTRY.

REQUIREMENT: BY LETTER DATED 12/27/82, THE NTSB RECOMMENDED SHOULDER HARNESSSES AT ALL SEAT LOCATIONS IN NORMAL CATEGORY ROTORCRAFT, NOT JUST IN THE FRONT SEATS. THIS PROJECT PARALLELS THE SMALL AIRPLANE DIRECTORATE'S REGULATORY PROJECTS ON OCCUPANT RESTRAINT AND SAFETY. IMPROVED OCCUPANT PROTECTION WAS CONSIDERED A HIGH PRIORITY SAFETY ISSUE IN THE PUBLIC AND FOREIGN AIRWORTHINESS AUTHORITIES RESPONSE TO THE ROTORCRAFT DIRECTORATE'S\*

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
NPRM IN FEDERAL REGISTER	06/01/85	05/01/87	06/03/87*
NPRM COMMENTS CLOSE	08/31/85	12/30/87	*
FINAL RULE IN FEDERAL REGISTER	03/31/86	12/30/88	*

STATUS: PROPOSAL NOS. 56, 57, 58A, 211, 212, 213, 214, AND 215 WERE PRESENTED DURING THE ROTORCRAFT REGULATORY REVIEW CONFERENCE HELD IN NEW ORLEANS, LA, DECEMBER 1979. ANPRM WILL NOT BE ISSUED. NPRM WAS ISSUED JUNE 3, 1987. \*

REMARKS/NOTES: SOME DELAY HAS BEEN CAUSED BY CONCERN FOR THE ESTIMATED HIGH COST OF COMPLIANCE WITH THIS PROPOSAL. SECTIONS AFFECTED: 27.561; 27.562; 27.785; 29.561; 29.562; 29.783; 29.785; AND 29.809.  
 \*REQUESTS FOR THE TOP 5 SAFETY ISSUES.

# AVS RESUME

ASW-84-012-M

PROJECT TITLE: HELICOPTER MINIMUM FLIGHTCREW  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN CERTIFICATION DIRECTORATE PROGRAMS

RESUME DATE: 02/10/87 LAST REVISION: 07/01/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: SHAPLEY, JOHN, ASW-110, (817) 624-5110  
TEAM LEADER : PLUMMER, T ASW-111 (817) 624-5111  
WRITER/EDITOR : MYERS, D ASW-111 (817) 624-5118 \*  
HONAKER, J ASW-111 (817) 624-5109

OBJECTIVE: REVISE PARTS 27 AND 29 TO REQUIRE A MINIMUM OF TWO PILOTS IF THE POWER CONTROL(S) (THROTTLES) ARE NOT A PART OF THE COLLECTIVE CONTROL.

REQUIREMENT: THE SOUTHWEST REGION POLL OF INTERNATIONAL HELICOPTER COMMUNITY FOR THE FIVE HIGHEST PRIORITY RULE CHANGES FOR SAFETY RESULTED IN THIS OBJECTIVE FROM A U.S. USER.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
PUBLISH ANPRM IN FEDERAL REGISTER	09/01/85	12/31/85	11/27/85
END OF COMMENT PERIOD	01/31/86	06/30/86	06/30/86
PUBLISH IN FEDERAL REGISTER (NPRM)	11/30/86	12/31/86	
PUBLISH IN FEDERAL REGISTER (FINAL RULE)	01/31/88		

STATUS: BASED ON PUBLIC MEETING COMMENTS, THE PROPOSAL WAS WITHDRAWN JANUARY 8, 1987. THIS RESUME IS CONTINUED IN THIS EDITION FOR ACCOUNTABILITY ONLY. IT WILL BE DELETED IN THE NEXT EDITION. \*

REMARKS/NOTES: CANCELLED.

## AVS RESUME

ASW-82-013-M

PROJECT TITLE: TRANSPORT ROTORCRAFT STRUCTURAL FATIGUE AND DAMAGE  
TOLERANCE  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN CERTIFICATION DIRECTORATE PROGRAMS

RESUME DATE: 02/11/87 LAST REVISION: 09/10/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: SHAPLEY, JOHN, ASW-110 (817) 624-5110  
TEAM LEADER : PLUMMER, T ASW-111 (817) 624-5111  
WRITER/EDITOR : MYERS, D ASW-111 (817) 624-5118  
WEAVER, R ASW-111 (817) 624-5122

OBJECTIVE: THIS AMENDMENT CHANGES THE RULE (SECTION 29.571)  
GOVERNING THE REQUIREMENTS FOR FATIGUE SUBSTANTIATION OF TRANSPORT  
CATEGORY HELICOPTER STRUCTURE. IT ADDS A REQUIREMENT THAT DAMAGE TOLERANCE  
CRITERIA BE USED "UNLESS SHOWN TO BE IMPRACTICAL." THE AMENDMENT IS  
INTENDED TO OBTAIN CONSISTENT USE OF STATE-OF-THE-ART DAMAGE TOLERANT  
MATERIALS AND DESIGN FEATURES IN TRANSPORT CATEGORY HELICOPTERS. THE  
INCREASED USE OF DAMAGE TOLERANT DESIGN FEATURES WILL REDUCE ACCIDENTS AND  
SAVE LIVES.

REQUIREMENT: THE HELICOPTER REGULATIONS MANAGEMENT OFFICE INITIATED THIS  
PROJECT TO UPDATE THE HELICOPTER STRUCTURAL FATIGUE REQUIREMENTS TO OBTAIN  
MORE CONSISTENT, EXTENSIVE DAMAGE TOLERANT STRUCTURE.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
PUBLISH IN FEDERAL REGISTER (ANPRM)	/ /		01/06/83
INITIAL PUBLIC MEETING	/ /		02/08/83
PUBLISH IN FEDERAL REGISTER (NPRM)	04/30/83	04/01/86	09/22/86
PUBLIC MEETING	06/30/83	07/15/86	03/05/87
PUBLISH IN FEDERAL REGISTER (RULE)	10/31/83	03/01/88	

STATUS: PUBLIC MEETING HELD 3/5/87. COMMENT PERIOD CLOSED 5/4/87. \*  
FINAL RULE IS DRAFTED AND IN COORDINATION. \*

REMARKS/NOTES: DOCKET NO. 23485, ANPRM NOTICE NO. 83-1.

AVS RESUME

ASW-83-014-M

PROJECT TITLE: ADVANCED V/STOL ROTORCRAFT STANDARDS  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN CERTIFICATION DIRECTORATE PROGRAMS

RESUME DATE: 02/13/87 LAST REVISION: 08/19/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: SHAPLEY, JOHN ASW-110, (817) 624-5110  
TEAM LEADER : PLUMMER, T ASW-111 (817) 624-5111  
WRITER/EDITOR : MYERS, D ASW-111 (817) 624-5118  
HONAKER, J ASW-111 (817) 624-5109

OBJECTIVE: DEVELOP AIRWORTHINESS STANDARDS FOR ADVANCED V/STOL ROTORCRAFT.

REQUIREMENT: CURRENT FAR PARTS 27 AND 29 AIRWORTHINESS STANDARDS ARE INSUFFICIENT FOR ANTICIPATED TILT ROTOR AND OTHER ADVANCED DESIGN ROTORCRAFT.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
PUBLICATION OF FIRST DRAFT, ANPRM	/ /		06/13/83
PUBLICATION ANPRM- (DROPPED)	08/31/84		
PUBLICATION NPRM- (DROPPED)	01/31/86		
PUBLICATION FINAL RULE- (DROPPED)	01/31/88		

STATUS: INTERIM POWERED LIFT AIRCRAFT AIRWORTHINESS CRITERIA PUBLISHED 12/01/86. PUBLIC MEETING WAS HELD 6/23-26/87 TO DISCUSS ISSUES AND TO ESTABLISH WORKING GROUPS TO RESOLVE THE ISSUES.

REMARKS/NOTES: DROPPED AS A REGULATORY PROJECT. \*

AVS RESUME

ASW-83-016-M

PROJECT TITLE: TRANSPORT CATEGORY ROTORCRAFT PERFORMANCE  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN CERTIFICATION DIRECTORATE PROGRAMS

RESUME DATE: 02/13/87 LAST REVISION: 09/09/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: SHAPLEY, JOHN, ASW-110, (817) 624-5110  
TEAM LEADER : PLUMMER, T ASW-111 (817) 624-5111  
WRITER/EDITOR : MYERS, D ASW-111 (817) 624-5118  
HONAKER, J ASW-111 (817) 624-5109

OBJECTIVE: REVISE AND CLARIFY TRANSPORT ROTORCRAFT PERFORMANCE  
AIRWORTHINESS STANDARDS AND TO ESTABLISH MINIMUM GRADIENTS OF CLIMB DURING  
TAKEOFF.

REQUIREMENT: CURRENT FAR PART 29 PERFORMANCE REQUIREMENTS ARE  
INSUFFICIENT, DO NOT INCORPORATE ESTABLISHED POLICY, AND LACK SEVERAL  
SIGNIFICANT FACTORS NEEDED TO CLEARLY DEFINE PERFORMANCE REQUIREMENTS.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED. REVISED ACTUAL		
PUBLICATION OF ANPRM IN FEDERAL REGISTER	06/30/83	10/15/85	10/17/85
PUBLICATION OF NPRM	12/31/83	09/30/88	*
PUBLICATION OF FINAL RULE	06/30/84	12/30/89	*

STATUS: SCHEDULE SLIPPAGE HAS OCCURRED DUE TO LARGE RULEMAKING  
BACKLOG. NPRM HAS BEEN DRAFTED AND IS IN COORDINATION.

REMARKS/NOTES: SECTIONS AFFECTED:  
29.51 TAKEOFF DATA: GENERAL  
29.53 TAKEOFF: CATEGORY A  
29.63 TAKEOFF: CATEGORY B  
29.65 CLIMB: ALL ENGINES OPERATING  
29.67 CLIMB: ONE ENGINE INOPERATIVE  
29.71 HELICOPTER ANGLE OF GLIDE: CATEGORY B  
29.73 PERFORMANCE AT MINIMUM OPERATING SPEED  
29.75 LANDING  
29.77 BALKED LANDING: CATEGORY A  
29.79 LIMITING HEIGHTS-SPEED ENVELOPE  
SLIPPAGE IN MILESTONE SCHEDULE IS DUE TO OTHER HIGHER REGULATORY PRIORITIES.



# AVS RESUME

ASW-83-017-M

PROJECT TITLE: ROTORCRAFT CERTIFICATION REQUIREMENTS COORDINATION WITH EUROPEAN AIRWORTHINESS AUTHORITIES STEERING COMMITTEE (AASC)  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN CERTIFICATION DIRECTORATE PROGRAMS

RESUME DATE: 02/13/87 LAST REVISION: 09/10/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: SHAPLEY, JOHN, ASW-110 (817) 624-5110  
TEAM LEADER : PLUMMER, T ASW-111 (817) 624-5111  
WRITER/EDITOR : MYERS, D ASW-111 (817) 624-5118  
WEAVER, R ASW-111 (817) 624-5122

OBJECTIVE: ALLOW FAR'S 27 AND 29 TO BECOME ACCEPTABLE CODES FOR TYPE CERTIFICATION OF ROTORCRAFT BY ALL AASC AUTHORITIES, THUS RELIEVING THE POSSIBLE NEED FOR FAR'S 27 AND 29.

REQUIREMENT: THIS PROJECT DEVELOPED FROM PROPOSALS ADVANCED AT A MEETING BETWEEN THE FAA AND AASC TO STANDARDIZE, AS FAR AS PRACTICAL, ROTORCRAFT CERTIFICATION RULES.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
DRAFT NPRM COMPLETE	/ /		04/01/87
ASW TEAM CONCURRENCE	04/15/87	09/15/87	06/29/87*
DIRECTORATE COORDINATION	12/17/87		
APO ECONOMIC ANALYSIS	01/27/88		
AGC REVIEW	03/30/88		
OST/OMB REVIEW	05/30/88		
NPRM ISSUANCE	06/08/88		
PUBLISH IN FEDERAL REGISTER	06/29/88		

STATUS: NPRM HAS BEEN DRAFTED FOR COORDINATION.

REMARKS/NOTES: SEPARATE PROJECTS WERE ESTABLISHED FOR PART 29 AIRFRAME, PROPULSION, FLIGHT, AND SYSTEMS AND EQUIPMENT PROPOSALS. NINETY-TWO PROPOSALS FOR REVISION OF FAR PART 29 SUBMITTED BY AASC CONSIDERED AT PUBLIC MEETING 4/28/86 - 5/2/86. TWENTY-TWO OF THE 92 PROPOSALS ARE CONSIDERED JUSTIFIED FOR PUBLICATION AS NPRM. THE 4 SEPARATE PROJECTS HAVE BEEN COMBINED INTO ONE PROJECT TO HANDLE THE JUSTIFIED 22 PROPOSALS. SIXTEEN OF THE REMAINING PROPOSALS WILL BE CHANGES TO AC 29-2. AASC HAS NOT SUBMITTED A PROPOSAL FOR FAR PART 27.

# AVS RESUME

ASW-83-018-M

PROJECT TITLE: REVISED ONE-ENGINE-INOPERATIVE (OEI) POWER RATING FOR ROTORCRAFT  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN CERTIFICATION DIRECTORATE PROGRAMS

RESUME DATE: 02/13/87 LAST REVISION: 08/19/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: WELLS, WILBUR, ASW-111 (817) 624-5123  
TEAM LEADER : PLUMMER, T ASW-111 (817) 624-5111  
WRITER/EDITOR : MYERS, D ASW-111 (817) 624-5118

OBJECTIVE: TO PROVIDE A REGULATORY BASIS FOR QUALIFICATION OF ROTORCRAFT AND ROTORCRAFT ENGINES FOR OPTIONAL 30-SECOND/2-MINUTE OEI RATINGS FOR HELICOPTERS.

REQUIREMENT: REVISE PARTS 27, 29, AND 33 TO SET FORTH QUALIFICATION AND PERFORMANCE ASSOCIATED WITH OPTIONAL 30-SECOND/2-MINUTE OEI RATINGS FOR HELICOPTERS.

MILESTONE SCHEDULE	COMPLETION DATES: SCHEP.	REVISED	ACTUAL
PETITION FROM AIA	/ /		09/30/84
FAA DIRECTORATE/JAR CONCURRENCE	03/31/85	07/30/88	
PRELIMINARY ECONOMIC ANALYSIS	05/31/85	03/30/89	
REGIONAL COUNSEL CONCURRENCE	07/31/85	09/30/87	
ISSUANCE (NPRM)	08/31/85	08/30/88	
GENERAL COUNSEL/OST/OMB ACTION	11/30/85	06/30/88	
PUBLISH IN FEDERAL REGISTER (NPRM)	12/15/85	09/15/88	
END OF COMMENT PERIOD	04/15/86	03/15/89	
PUBLISH IN FEDERAL REGISTER (FINAL RULE)	12/15/86	03/01/90	*

STATUS: DRAFT NPRM IS COMPLETE.

REMARKS/NOTES: THIS IS A JOINT RESPONSIBILITY OF THE ROTORCRAFT CERTIFICATION DIRECTORATE (SOUTHWEST REGION) AND THE ENGINE AND PROPELLER CERTIFICATION DIRECTORATE (NEW ENGLAND REGION), INVOLVING POTENTIAL CHANGES TO BOTH THE ROTORCRAFT AND ENGINE CERTIFICATION RULES. THIS PROJECT WAS INITIATED TO EVALUATE AN INFORMAL AIA PROPOSAL WHICH HAS EVOLVED INTO A PETITION FOR RULEMAKING. DOCKET NO. 24254. SCHEDULE SLIPPAGES ARE DUE TO OTHER HIGHER PRIORITY RULEMAKING ACTIVITY.

# AVS RESUME

ASW-83-020-M

PROJECT TITLE: ROTORCRAFT CERTIFICATION GUIDANCE  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN CERTIFICATION DIRECTORATE PROGRAMS

RESUME DATE: 02/17/87 LAST REVISION: 05/21/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: SHAPLEY, JOHN, ASW-110, (817) 624-5110 \*  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: PROVIDE GUIDANCE MATERIAL TO THE PUBLIC ON ACCEPTABLE  
METHODS OF COMPLIANCE WITH FAR'S 27 AND 29.

REQUIREMENT: ACHIEVE UNIFORMITY AND EFFICIENCY IN ROTORCRAFT  
CERTIFICATION.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
PUBLISH PARTIAL AC 29-2	/ /		05/31/83
PUBLISH AC 29-2, CHANGE 3	01/31/85	01/31/88	*
PUBLISH AC 29-2, CHANGE 4	12/31/89		
PUBLISH PARTIAL AC 27-1	07/31/85	09/30/85	08/29/85
PUBLISH AC 27-1, CHANGE 1	01/31/86	12/31/88	
PUBLISH AC 27-1, CHANGE 2	12/31/89		

STATUS: PUBLIC MEETING HELD MARCH 5-6, 1986, TO DISCUSS DRAFTS  
OF AC 29-2, CHANGE 3, AND AC 27-1, CHANGE 1. \*

REMARKS/NOTES: VARIOUS SPECIALIZED AC'S AND CONTINUOUS AC 29-2,  
AC 27-1 UPDATES WILL BE PROCESSED CONTINUALLY. SLIPPAGE IN MILESTONE  
SCHEDULE IS DUE TO UNPREDICTABLE EMERGENCY WORKLOAD.

# AVS RESUME

ASW-82-021-M

PROJECT TITLE: ADVANCED ELECTRONIC HELICOPTER STANDARDS  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN CERTIFICATION DIRECTORATE PROGRAMS

RESUME DATE: 02/17/87 LAST REVISION: 07/01/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: SHAPLEY, JOHN, ASW-110, (817) 624-5110  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: PROVIDE GUIDANCE MATERIAL WHEREBY RAPIDLY ADVANCING ELECTRONIC AND ELECTROMECHANICAL ACTUATOR TECHNOLOGY CAN BE INCORPORATED IN NEW ROTORCRAFT. FLY-BY-WIRE/FLY-BY-LIGHT FULL AUTHORITY CONTROL IS TO BE ADDRESSED.

REQUIREMENT: ASSURE THAT REGULATIONS AND GUIDANCE MATERIAL ALLOW INNOVATIVE APPLICATION OF ELECTRICAL-ELECTRONIC TECHNOLOGY WITHOUT UNDUE CONSTRAINTS.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
UPDATE OF STANDARDS	/ /		01/31/83
PUBLISH DIGITAL SYSTEM HANDBOOK	/ /		07/31/83
COMPLETE FIRST DRAFT OF AC	01/31/85	12/31/87	
CLOSE PUBLIC COMMENTS	07/31/85	06/01/88	
PUBLISH AC	07/31/86	12/01/88	

STATUS: THE DIRECTORATE PARTICIPATED IN THE AWS-100 FLY-BY-WIRE SEMINAR TO ASSURE STANDARDIZATION ACROSS DIRECTORATES. \*

REMARKS/NOTES: POLICY MATERIAL DEVELOPMENT SCHEDULE IS DEPENDENT ON APPLICATIONS WHICH WERE NOT FORTHCOMING WHEN ORIGINALLY ENVISIONED.

# AVS RESUME

ASW-82-022-M

PROJECT TITLE: ROTORCRAFT HANDLING QUALITIES ASSESSMENT  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN CERTIFICATION DIRECTORATE PROGRAMS

RESUME DATE: 02/17/87 LAST REVISION: 08/19/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: SHAPLEY, JOHN, ASW-110, (817) 624-5110  
TEAM LEADER : PLUMMER, T ASW-111 (817) 624-5111  
WRITER/EDITOR :

OBJECTIVE: DEVELOP HANDLING QUALITIES CERTIFICATION GUIDANCE MATERIAL. ATTENTION WILL BE GIVEN TO STATIC LONGITUDINAL STABILITY, CONTROL FORCES, AND STICK VS. SPEED GRADIENTS.

REQUIREMENT: ASSURE APPROPRIATE PILOT LIMIT FORCES, ADVANCED CONTROLLER CRITERIA, AND PILOT RESPONSES.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
AC 29-2, CHANGE 1	01/31/85		11/19/84
CHANGE TO ADVISORY CIRCULAR 29-2	01/31/87	01/31/89	*

STATUS: ADVISORY CIRCULAR (AC) 29-2 PUBLISHED MAY 1983 WITH BASIC HANDLING QUALITY INFORMATION. CHANGE 1 TO AC 29-2 ADDED INFORMATION ON SECTION 29.141, GENERAL FLIGHT CHARACTERISTICS; SECTION 29.143, CONTROLLABILITY AND MANEUVERABILITY; AND SECTION 29.161, TRIM.

REMARKS/NOTES: ONGOING PROGRAM; NO SPECIFIC MILESTONES ARE ESTABLISHED YET.

# AVS RESUME

ASW-82-030-M

PROJECT TITLE: ROTORCRAFT TYPE CERTIFICATION  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN CERTIFICATION DIRECTORATE PROGRAMS

RESUME DATE: 02/17/87 LAST REVISION: 08/21/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST:  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: CERTIFY ROTORCRAFT TO THE REQUIREMENT OF FAR'S 27 AND 29.

REQUIREMENT: ASSURE SAFE ROTORCRAFT DESIGNS WITHOUT UNNECESSARY  
CONSTRAINTS TO ECONOMICAL AND INNOVATIVE CERTIFICATION PROGRAMS.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
FIRST ICING CERTIFICATION	/ /		03/31/84

STATUS: NONE.

REMARKS/NOTES: SEE RESUMES AVS-81-150-M AND ADL-82-100-M FOR RELATED  
ICING ACTIVITIES. THIS IS A CONTINUING, LONG-TERM PROJECT.

# AVS RESUME

ASW-84-111-M

PROJECT TITLE: TURBINE BURST PROTECTION FOR TRANSPORT CATEGORY  
HELICOPTERS  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN CERTIFICATION DIRECTORATE PROGRAMS

RESUME DATE: 06/02/87 LAST REVISION: 07/01/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: SHAPLEY, JOHN, ASW-110, (817) 624-5110  
TEAM LEADER : PLUMMER, T ASW-111 (817) 624-5111  
WRITER/EDITOR : MYERS, D ASW-111 (817) 624-5118 \*  
WELLS, W ASW-111 (817) 624-5123

OBJECTIVE: TO PROVIDE A MEASURE OF SAFETY IN TRANSPORT HELICOPTERS  
FROM THE PROBABLE EVENT OF UNCONTAINED ENGINE ROTOR BURST.

REQUIREMENT: REVISE SECTION 29.901 TO REMOVE PARAGRAPH (C)(2). REVISE  
SECTION 29.903 TO ADD A NEW PARAGRAPH THAT WOULD REQUIRE A MEANS TO  
MINIMIZE THE HAZARDS OF ENGINE ROTOR BURST.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
DIRECTOR, SOUTHWEST REGION ISSUANCE (NPRM)	04/01/85	04/20/88	*
PUBLISH IN FEDERAL REGISTER (NPRM)	10/31/85	05/01/88	
END OF COMMENT PERIOD	12/31/85	11/01/88	
PUBLISH IN FEDERAL REGISTER (FINAL RULE)	08/31/86	11/01/89	

STATUS: FURTHER ECONOMIC DATA IS REQUIRED PRIOR TO NPRM. THE  
TECHNICAL CENTER IS ASSISTING IN COLLECTION OF THIS DATA.

REMARKS/NOTES: THIS PROJECT WAS ACTIVATED BY INSTRUCTIONS FROM THE  
DIRECTOR, SOUTHWEST REGION, ASW-1, TO PROMULGATE A RULE CHANGE TO PROVIDE  
PROTECTION FROM THE HAZARDS OF A TURBINE ENGINE BURST.

# AVS RESUME

ASW-84-112-M

PROJECT TITLE: HELICOPTER INSTRUMENT FLIGHT  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN CERTIFICATION DIRECTORATE PROGRAMS

RESUME DATE: 06/02/87 LAST REVISION: 07/01/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: SHAPLEY, JOHN, ASW-110, (817) 624-5110  
TEAM LEADER : PLUMMER, T ASW-111 (817) 624-5111  
WRITER/EDITOR : MYERS, D ASW-111 (817) 624-5118 \*  
HONAKER, J ASW-111 (817) 624-5109

OBJECTIVE: REVISE APPENDIX B OF PARTS 27 AND 29 TO PERMIT IFR OPERATIONS AT AIRSPEEDS BELOW THE NORMAL MINIMUM INSTRUMENT AIRSPEED DURING APPROACH AND LANDING.

REQUIREMENT: THE ROTORCRAFT STANDARDS STAFF AND PREVIOUS FAA/NASA STUDIES HAVE SHOWN THAT LOW AIRSPEED (DECELERATING) APPROACHES CAN BE SATISFACTORILY ACCOMPLISHED EVEN WHEN FLIGHT CHARACTERISTICS ARE DIFFERENT THAN AT HIGHER AIRSPEEDS.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
PUBLISH NPRM IN FEDERAL REGISTER	09/30/85	01/01/86	06/12/86
END OF COMMENT PERIOD	02/28/86	07/01/86	04/03/87*
PUBLISH FINAL RULE IN FEDERAL REGISTER	04/30/87	07/15/88	*

STATUS: SCHEDULE SLIPPAGES ARE DUE TO OTHER HIGH PRIORITY RULEMAKING ACTIVITY.

REMARKS/NOTES: FAR SECTIONS AFFECTED: APPENDIX B, PARTS 27 AND 29, AIRWORTHINESS CRITERIA FOR HELICOPTER INSTRUMENT FLIGHT.



## AVS RESUME

ASW-85-113-M

PROJECT TITLE: CRASH RESISTANT FUEL SYSTEMS  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN CERTIFICATION DIRECTORATE PROGRAMS

RESUME DATE: 06/02/87 LAST REVISION: 09/09/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: SHAPLEY, JOHN, ASW-110, (817) 624-5110  
TEAM LEADER : PLUMMER, T ASW-111 (817) 624-5111  
WRITER/EDITOR : MYERS, D ASW-111 (817) 624-5118  
WELLS, W ASW-111 (817) 624-5123

OBJECTIVE: TO REDUCE (AS MUCH AS POSSIBLE OR REASONABLE) INJURIES OR FATALITIES RESULTING FROM IGNITION OF FLAMMABLE FLUIDS FOLLOWING AN OTHERWISE SURVIVABLE CRASH OF A ROTORCRAFT.

REQUIREMENT: TO GENERATE A NOTICE FOLLOWED BY CORRESPONDING RULE CHANGES TO IMPLEMENT REQUIREMENTS FOR CRASH RESISTANT FUEL SYSTEMS IN PARTS 27 AND 29.

MILESTONE SCHEDULE	COMPLETION DATES:	SCHED.	REVISED	ACTUAL
DRAFT NOTICE COMPLETED		03/01/86	01/01/88	*
ISSUED BY ASW-1		09/01/86	09/15/88	*
PUBLISH IN FEDERAL REGISTER		12/01/86	10/01/88	*

STATUS: EXISTING DEVELOPMENTS FOR CRASH RESISTANT FUEL SYSTEMS ARE BEING STUDIED. ACTIVITIES OF THE GENERAL AVIATION SAFETY PANEL (GASP) MAY INFLUENCE THE DERIVATION OF THE PROPOSED RULE.

REMARKS/NOTES: SEVERAL PROPOSALS IN ROTORCRAFT REGULATORY REVIEW NOTICE 3 ENCOUNTERED OBJECTIONS FROM THE PUBLIC AND/OR DID NOT EXHIBIT A POSITIVE COST/BENEFIT RATIO. THE CONCEPTS OF THESE PROPOSALS ARE BEING RECONSIDERED IN THIS PROJECT. UPDATED METHODS AND DATA WILL AFFECT PROBABILITY OF ACCEPTANCE.

# AVS RESUME

ASW-82-114-M

PROJECT TITLE: ROTORCRAFT REGULATORY REVIEW PROGRAM NOTICE NO. 3  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN CERTIFICATION DIRECTORATE PROGRAMS

RESUME DATE: 06/02/87 LAST REVISION: 09/09/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: SHAPLEY, JOHN, ASW-110, (817) 624-5110  
TEAM LEADER : PLUMMER, T ASW-111 (817) 624-5111  
WRITER/EDITOR : MYERS, D ASW-111 (817) 624-5118  
WELLS, W ASW-111 (817) 624-5123

OBJECTIVE: THIS NPRM PROPOSES CHANGES TO PARTS 1, 27, 29, AND 33 IN THE AREA OF PROPULSION SYSTEM REQUIREMENTS. OVER 100 INDIVIDUAL CHANGES ARE BEING CONSIDERED. SIGNIFICANT NEW RULES OR CHANGES TO RULES EXIST IN THE AREA OF NEW ONE-ENGINE-INOPERATIVE RATINGS WITHOUT TIME LIMITS, DETAILED COMBUSTION HEATER REQUIREMENTS, LIGHTNING PROTECTION, FUEL JETTISONING SYSTEMS, FUEL SYSTEM TESTS, AND OIL SYSTEM REQUIREMENTS.

REQUIREMENT: THIS NPRM IS BEING DEVELOPED FROM PROPOSALS SUBMITTED AT THE ROTORCRAFT REGULATORY REVIEW CONFERENCE IN DECEMBER 1979 IN NEW ORLEANS, LA., FROM SPECIAL CONDITIONS APPLIED TO VARIOUS HELICOPTER CERTIFICATION PROGRAMS AND FROM A BACKLOG OF PROPOSED CHANGES DEVELOPED WITHIN THE FAA SINCE FINALIZATION OF THE PROPOSALS PRESENTED AT THE ROTORCRAFT REGULATORY REVIEW.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
PUBLISH IN FEDERAL REGISTER (NPRM)	11/15/82	12/15/84	11/27/84
END OF COMMENT PERIOD	02/15/83	03/26/85	03/26/85
PUBLISH IN FEDERAL REGISTER (FINAL)	09/20/83	12/01/87	*

STATUS: NPRM PUBLISHED IN FEDERAL REGISTER 11/27/84; 49 FR 46670;  
DOCKET NO. 24337, NOTICE NO. 84-19.

REMARKS/NOTES: SLIPPAGE IN MILESTONE SCHEDULE IS DUE TO OTHER REGULATORY PRIORITIES.

# AVS RESUME

ASW-82-115-M

PROJECT TITLE: REGULATORY REVIEW PROGRAM NOTICE NO. 4 (AIRFRAME)  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN CERTIFICATION DIRECTORATE PROGRAMS

RESUME DATE: 06/02/87 LAST REVISION: 09/09/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: SHAPLEY, JOHN, ASW-110, (817) 624-5110  
TEAM LEADER : PLUMMER, T ASW-111 (817) 624-5111  
WRITER/EDITOR : MYERS, D ASW-111 (817) 624-5118  
MAJOR, J ASW-111 (817) 624-5117

OBJECTIVE: THIS IS NOTICE NO. 4 OF A SERIES OF NOTICES ISSUED AS A PART OF THE FAA'S COMPREHENSIVE ROTORCRAFT REGULATORY REVIEW PROGRAM. THIS NOTICE CONTAINS PROPOSALS WHICH WOULD AMEND AND UPDATE THE AIRFRAME AND RELATED EQUIPMENT REQUIREMENTS IN PARTS 27 AND 29 OF THE FEDERAL AVIATION REGULATIONS.

REQUIREMENT: REPEATED REQUESTS FROM ROTORCRAFT OWNERS/OPERATORS AND FAA FIELD REPRESENTATIVES TO CHANGE THESE PARTS TO APPLY SPECIFICALLY TO ROTORCRAFT RATHER THAN TAKING FIXED-WING REGULATIONS AND ARBITRARILY ASSIGNING THEM TO ROTORCRAFT. THIS DEFEATED MANY OF THE INHERENT FUNCTIONAL CHARACTERISTICS OF THE ROTORCRAFT.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
PUBLISH IN FEDERAL REGISTER (NPRM)	07/30/82	10/30/87	*
END OF COMMENT PERIOD	09/15/82	04/01/88	
PUBLISH IN FEDERAL REGISTER (RULE)	04/15/83	04/01/89	

STATUS: SOME SCHEDULE SLIPPAGE HAS OCCURRED DUE TO LARGE RULEMAKING BACKLOG.

REMARKS/NOTES: NOTICE NO. 4 CONCERNS THE PROPOSALS AND INFORMATION OR DATA SUBMITTED FOR RULEMAKING ACTION ON AIRFRAME AND RELATED EQUIPMENT REQUIREMENTS RESULTING FROM THE ROTORCRAFT REVIEW PUBLIC MEETING HELD IN DECEMBER 1979.

# **AIRPORTS PROGRAMS**

## AIRPORTS SUMMARY

### 1. Major Accomplishments Include:

- (1) The Office of Airports Standards has published and distributed over 33,000 copies of the current Heliport Design Guide (AC 150/5390-1B) which provides state-of-the-art guidance for heliport development.
- (2) The Office of Airport Planning and Programming has incorporated heliport requirements in the National Plan of Integrated Airport Systems. Approximately \$10 million in grants have been made for heliport development, system planning, and master planning under the Airport Improvement Program (AIP).
- (3) Airport Planning and Programming and its field elements have provided advisory services to local governments, engineers, architects, and planners on heliport planning, design, and construction and have worked with industry groups to set up local committees for stimulating interest in heliport development.
- (4) The Indianapolis, Indiana, heliport opened for VFR operations in December 1984. A VOR/DME nonprecision instrument approach was commissioned in August 1985.
- (5) The New Orleans, Louisiana, heliport opened for VFR operations in January 1986.
- (6) The Wall Street Heliport in New York opened for VFR operations in September 1987.

### 2. Current Projects Include:

- (1) The Airport Standards Office is revising the Heliport Design AC to include IFR design guidance (see Resume ARP-82-020-M).
- (2) Airport Planning and Programming and its regional counterparts are involved in various local and system-wide heliport planning efforts (see Resumes ARP-82-010-M through ARP-82-014-M).
- (3) Projects are underway to implement industry recommended improvements to the New Orleans heliport.
- (4) The FAA/Industry National Prototype Heliport Demonstration and Development Program has been transferred to the Associate Administrator for Airports.

3. Future Plans Include:

- (1) Airports Standards intends to periodically revise the Heliport Design Advisory Circular to incorporate new information and findings received from various sources (see Resume ARP-82-020-M).
- (2) Airport Planning and Programming will continue to promote the inclusion of heliports in urban transportation planning and the development of a system of public-use heliports. Funding will be available for heliport development and planning (see Resume ARP-82-010-M).
- (3) To continue FAA/Industry dialogue to refine approach airspace requirements for VFR and IFR operations.

4. Problems/Needs and Actions Being Taken:

- (1) The versatility of the helicopter, especially its ability to land and take off from a small area, has created expectations among helicopter owners and enthusiasts that public-use, city-center heliports would be available to exploit its capabilities. In reality, a system of city-center heliports has yet to be developed. This deficiency is related to developing public support for heliports at both grass roots and official levels, as well as the difficulty of securing suitable sites. The lack of public support is based on insufficient awareness of heliport benefits, as well as exaggerated concerns over helicopter safety and noise. Their perception that helicopters have a limited use rather than being an established public conveyance is also a factor. Public officials' support of heliport development may also be viewed as a political liability.

The matter of site selection is not simply related to noise and safety. While the land area required for a heliport may be relatively small compared to that required for an airport, heliports are needed in those locations in a community where there are competing land uses.

- (2) The cost of constructing a heliport suitable for private use is relatively small when compared to the cost of owning/operating a helicopter. Therefore, many helicopter owners have constructed their own facilities at no expense to Federal/State/local governments. This, however, does not negate the desirability of providing public-use heliports in metropolitan areas.
- (3) The lack of a system of public-use, metropolitan area heliports, is inhibiting the full potential of helicopter transportation. Airport Planning and Programming efforts are directed at informing local governments of the benefits of heliports and providing grants for their planning and construction.

5. Agency Obligations/Responsibilities to Provide for Rotorcraft—What and How to Improve Support:

- (1) To the maximum practical extent, the agency supports a broad range of efforts to optimize the unique properties and potential benefits of rotorcraft.
- (2) Data to develop improved standards for IFR heliports, including approach and departure protection, is being acquired.
- (3) Adherence to FAA standards is obligatory for Federally-aided heliport development. Additional guidance is needed to prevent the standards from being misapplied by state/local governments, with the effect of suppressing private heliport development.

N	H	C	<u>Airports Programs (ARP)</u>
	x		ARP-82-010-M Heliport Planning and Development
	x		* ARP-82-011-M Heliport System Planning
	x		* ARP-82-012-M Heliport Site Selection and Master Planning
	x		* ARP-82-013-M Heliport Development Grants
	x		ARP-82-014-M Advisory Services to Aviation and City Planners
	x		* ARP-82-015-M Liaison Support to Industry Groups Seeking Heliport Development
	x		ARP-82-016-M Sponsor Heliport Planning Seminars for Helicopter Operators and City Planners
	x		ARP-82-017-M Heliport Planning Guide
	x		ARP-82-020-M Heliport Design Guide (Advisory Circular)
			ARP-87-021-M Heliport Research and Development
x	x		ARP-83-030-M National Prototype Heliport Demonstration and Development Program
	x		ARP-86-031-M Indianapolis Downtown Heliport
	x		ARP-86-032-M New Orleans Heliport

\* = Long-term, Continuing Program/Project  
 N = National Airspace System  
 H = Heliports  
 C = Certification



**AVS RESUME****ARP-82-010-M**

-----  
PROJECT TITLE: HELIPORT PLANNING AND DEVELOPMENT  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIRPORTS PROGRAMS  
-----

RESUME DATE: 02/17/87      LAST REVISION: 05/22/87      REACTIVATED:

-----  
STAFF: PRINCIPAL SPECIALIST: BOLDUC, GEORGE, APP-400, (202) 267-8786  
TEAM LEADER : BURKE, J      AAS-100      (202) 267-8763  
WRITER/EDITOR :

-----  
OBJECTIVE: DEVELOP PLANNING AND DESIGN STANDARDS FOR ESTABLISHING  
HELIPORTS. ENCOURAGE COMMUNITIES TO PLAN AND CONSTRUCT CITY-CENTER  
HELIPORTS USING GRANT FUNDS AVAILABLE THROUGH THE AIRPORT IMPROVEMENT  
PROGRAM.  
-----

REQUIREMENT: MOST LARGE CITIES LACK ADEQUATE PUBLIC-USE HELIPORTS.  
-----

STATUS: GRANT FUNDS FOR HELIPORT PLANNING, DESIGN, AND DEVELOPMENT  
ARE AVAILABLE UNDER THE AIRPORT IMPROVEMENT PROGRAM.  
-----

REMARKS/NOTES: THE INITIATIVE FOR REQUESTING GRANT FUNDS FOR DEVELOPING  
PUBLIC-USE HELIPORTS MUST COME FROM THE COMMUNITIES. HELICOPTER NOISE  
MEASUREMENTS, MLS SITING REQUIREMENTS, AND TERPS PROCEDURES ARE CLOSELY  
RELATED PROGRAMS.  
-----  
-----

-----  
PROJECT TITLE: HELIPORT SYSTEM PLANNING  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIRPORTS PROGRAMS  
-----

RESUME DATE: 02/17/87      LAST REVISION: 05/06/87      REACTIVATED:

-----  
STAFF: PRINCIPAL SPECIALIST: BOLDUC, GEORGE, APP-400, (202) 267-8786      \*  
      TEAM LEADER :  
      WRITER/EDITOR :

-----  
OBJECTIVE:      INCORPORATE HELIPORT DEVELOPMENT REQUIREMENTS  
(LOCATIONS AND COSTS) IN THE NATIONAL PLAN OF INTEGRATED AIRPORT SYSTEMS AS  
WELL AS IN STATE AND REGIONAL AVIATION AND TRANSPORTATION PLANS. GRANT  
FUNDS ARE AVAILABLE TO STATES AND REGIONAL PLANNING ORGANIZATIONS FOR  
HELIPORT SYSTEM PLANNING.  
-----

-----  
REQUIREMENT:      THE REQUIREMENTS FOR HELIPORTS ARE OFTEN OMITTED OR  
NEGLECTED FROM AVIATION PLANNING BECAUSE OF INDIFFERENCE OR  
UNFAMILIARITY. IDENTIFYING NEEDS IS THE FIRST STEP TOWARD ESTABLISHING  
HELIPORTS.  
-----

-----  
STATUS:      HELIPORT SYSTEM PLANNING IS A CONTINUING EFFORT.  
-----

-----  
REMARKS/NOTES:      GRANT FUNDING UNDER THE AIRPORT IMPROVEMENT PROGRAM CAN BE  
USED FOR HELIPORT SYSTEM STUDIES OR FOR INCORPORATING HELIPORT PLANNING  
WITHIN STATE AND REGIONAL AIRPORT PLANS. CONTINUING AVAILABILITY OF  
AIP FUNDING IS ASSUMED.  
-----  
-----

AVS RESUME

ARP-82-012-M

PROJECT TITLE: HELIPORT SITE SELECTION AND MASTER PLANNING  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIRPORTS PROGRAMS

RESUME DATE: 02/17/87 LAST REVISION: 05/06/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: BOLDUC, GEORGE, APP-400, (202) 267-8786 \*  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: PROVIDE ADVISORY SERVICES AND GRANT FUNDING FOR HELIPORT  
SITE SELECTION (INCLUDING ENVIRONMENTAL ASSESSMENT) AND MASTER PLANS.

REQUIREMENT: SITE SELECTION AND MASTER PLANNING PRECEDE ISSUING  
GRANTS FOR CONSTRUCTION.

STATUS: HELIPORT SITE SELECTION AND MASTER PLANNING IS A  
CONTINUING EFFORT INVOLVING WORKING WITH CITIES AND COUNTIES.

REMARKS/NOTES: GRANT FUNDING UNDER THE AIRPORT IMPROVEMENT PROGRAM CAN BE  
USED FOR SELECTING AND PLANNING FOR SPECIFIC HELIPORTS. CONTINUING  
AVAILABILITY OF AIP FUNDING IS ASSUMED.

AVS RESUME

ARP-82-013-M

PROJECT TITLE: HELIPORT DEVELOPMENT GRANTS  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIRPORTS PROGRAMS

RESUME DATE: 02/17/87 LAST REVISION: 05/22/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: BOLDUC, GEORGE, APP-400, (202) 267-8786  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: CONSTRUCT ADDITIONAL PUBLIC-USE HELIPORTS USING AIP FUNDING. \*

REQUIREMENT: MOST CITIES ARE WITHOUT A SUITABLE PUBLIC-USE CITY-CENTER HELIPORT. FINANCIAL AID AND FAA SUPPORT STRENGTHEN THE EFFORTS TO OBTAIN ONE.

STATUS: HELIPORT DEVELOPMENT GRANTS ARE A CONTINUING EFFORT. GRANTS FOR HELIPORT PLANNING AND CONSTRUCTION ARE MADE ON AN ANNUAL BASIS. AT PRESENT, SOME HELIPORTS ARE IN PLANNING STAGES; OTHERS ARE IN CONSTRUCTION STAGES. \*

REMARKS/NOTES: GRANT FUNDING UNDER THE AIRPORT IMPROVEMENT PROGRAM CAN BE USED FOR ACQUIRING LAND AND CONSTRUCTING HELIPORTS. CONTINUING AVAILABILITY OF AIP FUNDING IS ASSUMED.

# AVS RESUME

ARP-82-014-M

PROJECT TITLE: ADVISORY SERVICES TO AVIATION AND CITY PLANNERS  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIRPORTS PROGRAMS

RESUME DATE: 02/17/87 LAST REVISION: 09/30/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: BOLDUC, GEORGE, APP-400, (202) 267-8786  
TEAM LEADER : BURKE, J AAS-100 (202) 267-8763  
WRITER/EDITOR :

OBJECTIVE: SUPPORT HELIPORT DEVELOPMENT BY PROVIDING GUIDANCE TO LOCAL GOVERNMENTS, ENGINEERS, PLANNERS, AND THE PUBLIC.

REQUIREMENT: HELIPORT EXPERTISE OFTEN DOES NOT EXIST IN LOCAL GOVERNMENT--AND IS OFTEN ALSO LACKING IN THE CONSULTING FIRMS THEY EMPLOY FOR TRANSPORTATION PLANNING. SUPPORT HELIPORT PLANNING SEMINARS FOR HELICOPTER OPERATORS AND CITY PLANNERS ON A REQUEST BASIS THROUGH FAA REGIONS. PROVIDE LIAISON SUPPORT TO VARIOUS INFORMAL COMMITTEES AND TASK FORCES SEEKING LOCAL GOVERNMENT SUPPORT FOR HELIPORT DEVELOPMENT.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
SPONSOR HELIPORT PLANNING SEMINAR	12/31/85	12/31/88	
HELIPORT PLANNING GUIDE	12/31/85	12/31/88	

STATUS: ADVISORY SERVICES TO AVIATION AND CITY PLANNERS ARE PROVIDED ON A CONTINUING BASIS.

REMARKS/NOTES: THE MAJOR PORTION OF SERVICES ARE NOT DIRECTLY CONNECTED WITH THE AIP GRANT PROGRAM. HELIPORT INFORMATION AND GUIDANCE IS NOW BEING DEVELOPED IN THE FOLLOWING AREAS:

- (A) ANALYSIS OF FOUR STATE HELIPORT SYSTEM PLANS \*
- (B) ANALYSIS OF FOUR CITY/METROPOLITAN HELIPORT SYSTEM PLANS \*
- (C) DEVELOPMENT OF CASE HISTORIES OF THE HELICOPTER ACTIVITIES AND ASSOCIATED HELIPORTS IN FOUR URBAN AREAS POINTING OUT THE REASONS WHY THESE HELIPORTS EITHER SUCCEEDED OR FAILED \*
- (D) DEVELOPMENT OF METHODS, PLANNING TOOLS, QUESTIONNAIRES, AND DATA BASES TO IDENTIFY HELICOPTER NEEDS AND TO AID IN THE HELIPORT PLANNING PROCESS. \*

AVS RESUME

ARP-82-015-M

-----  
PROJECT TITLE: LIAISON SUPPORT TO INDUSTRY GROUPS SEEKING HELIPORT  
DEVELOPMENT

PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIRPORTS PROGRAMS  
-----

RESUME DATE: 02/20/87 LAST REVISION: 05/06/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: BOLDUC, GEORGE, APP-400, (202) 267-8786 \*

TEAM LEADER :

WRITER/EDITOR :

-----  
OBJECTIVE: PROVIDE A LIAISON MEMBER TO VARIOUS INFORMAL COMMITTEES  
AND TASK FORCES SEEKING LOCAL GOVERNMENT SUPPORT FOR HELIPORT DEVELOPMENT.  
-----

REQUIREMENT: IN MANY LARGE CITIES, INDUSTRY/CITIZEN GROUPS ATTEMPT TO  
SECURE A PUBLIC-USE HELIPORT. FAA LIAISON MEMBERS STRENGTHEN EFFORT.  
-----

STATUS: LIAISON SUPPORT TO INDUSTRY GROUPS SEEKING HELIPORT  
DEVELOPMENT IS A CONTINUING EFFORT.  
-----

REMARKS/NOTES: CANCEL. REQUIREMENTS INCLUDED IN ARP-82-014-M. \*

AVS RESUME

ARP-82-016-M

PROJECT TITLE: SPONSOR HELIPORT PLANNING SEMINARS FOR HELICOPTER  
OPERATORS AND CITY PLANNERS  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIRPORTS PROGRAMS

RESUME DATE: 02/20/87 LAST REVISION: 07/02/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: BOLDUC, GEORGE, APP-400, (202) 267-8786  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: BRING HELICOPTER OPERATORS, FAA, AND CITY PLANNERS  
TOGETHER TO FOSTER HELIPORT DEVELOPMENT THROUGH EXCHANGING IDEAS.

REQUIREMENT: HELIPORT DEVELOPMENT IS SIMPLIFIED IF LOCAL PLANNERS ARE  
FAMILIAR WITH ROTORCRAFT NEEDS. HELICOPTER EXPERTISE IS GENERALLY LACKING  
IN LOCAL GOVERNMENT AGENCIES.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
SPONSOR HELIPORT PLANNING SEMINAR	12/31/85	12/31/88	

STATUS: THIS RESUME IS CONTINUED IN THIS EDITION FOR ACCOUNTABILITY \*  
ONLY. IT WILL BE DELETED IN THE NEXT EDITION. \*

REMARKS/NOTES: CANCEL. REQUIREMENTS INCLUDED IN ARP-82-014-M.

AVS RESUME

ARP-82-017-M

PROJECT TITLE: HELIPORT PLANNING GUIDE  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIRPORTS PROGRAMS

RESUME DATE: 02/20/87 LAST REVISION: 07/02/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: BOLDUC, GEORGE, APP-400, (202) 267-8786  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: PREPARE ADVISORY MATERIAL FOR CITY PLANNERS WITHOUT AVIATION BACKGROUND. FOSTER HELIPORT DEVELOPMENT THROUGH INFORMING PLANNERS OF ROTORCRAFT BENEFITS AND LAND-USE IMPACT.

REQUIREMENT: SEMITECHNICAL GUIDANCE HELPS GET CITY PLANNERS MORE INVOLVED IN HELIPORT ISSUES.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
HELIPORT PLANNING GUIDE	12/31/85	12/31/88	

STATUS: THIS RESUME IS CONTINUED IN THIS EDITION FOR ACCOUNTABILITY \*  
ONLY. IT WILL BE DELETED IN THE NEXT EDITION. \*

REMARKS/NOTES: A GUIDE IS SCHEDULED FOR 1989 TO FOLLOW THE PLANNING SEMINAR (RESUME ARP-82-014-M). IT WOULD PROVIDE CONTINUITY IN THE PLANNING PROCESS, INPUT FROM THE SEMINAR, AND INCLUDE DISCUSSION OF NOISE STANDARDS WHICH ARE SCHEDULED FOR DEVELOPMENT IN 1987. SCHEDULED COMPLETION DATE FOR THE HELIPORT PLANNING GUIDE HAS BEEN RESCHEDULED IN ACCORDANCE WITH FY-1988 BUDGET ALLOCATIONS FOR THIS EFFORT. CANCEL. REQUIREMENTS INCLUDED IN ARP-82-014-M.



# AVS RESUME

ARP-82-020-M

PROJECT TITLE: HELIPORT DESIGN GUIDE ADVISORY CIRCULAR  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIRPORTS PROGRAMS

RESUME DATE: 02/20/87 LAST REVISION: 09/30/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: BURKE, JACK, AAS-100, (202) 267-8763  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: REVISE AND UPDATE THE EXISTING GUIDE TO PROVIDE  
STANDARDS FOR IFR HELIPORTS REFLECTING CHANGES IN HELICOPTER TECHNOLOGY AND  
OPERATIONAL REQUIREMENTS.

REQUIREMENT: THE HELIPORT DESIGN GUIDE WAS A WIDELY DISTRIBUTED  
(OVER 30,000 COPIES) FAA ADVISORY CIRCULAR. THE STANDARDS THEREIN WERE  
USED IN FEDERAL AID OF PROJECTS. THE REVISED HELIPORT DESIGN ADVISORY  
CIRCULAR IS EXPECTED TO HAVE COMPARABLE DISTRIBUTION.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
REVISION OF EXISTING AC	07/31/86		07/28/86
REVISED AC WITH IFR CRITERIA	05/31/84	12/31/87	

STATUS: FINAL COORDINATION WITH INDUSTRY UNDERWAY.

REMARKS/NOTES: DRAFTS OF THE REVISED AC HAVE BEEN RECOORDINATED WITH THE  
AVIATION COMMUNITY. THE RECOMMENDATIONS OF THE WORKSHOPS TOGETHER WITH  
MEETINGS AND WRITTEN COMMENTS HAVE BEEN INCORPORATED IN A FINAL DRAFT. \*  
THIS FINAL DRAFT HAS BEEN THE SUBJECT OF A CAREFUL REVIEW BY THE HAI  
TECHNICAL COMMITTEE AND OTHER INDUSTRY ELEMENTS. A CONSENSUS APPEARS TO BE  
CLOSE AT HAND. CHANGES/REVISIONS WILL BE UNDERTAKEN PERIODICALLY IN  
CONJUNCTION WITH DEVELOPMENTS IN RELATED FAA HELIPORT AND HELICOPTER  
PROGRAMS.

AVS RESUME

ARF-87-021-K

PROJECT TITLE: HELIPORT RESEARCH AND DEVELOPMENT  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIRPORTS PROGRAMS

RESUME DATE: 09/30/87 LAST REVISION: 09/30/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: BURKE, JACK, AAS-100 (202) 267-8763  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: EVALUATE REQUESTED RESEARCH AND DEVELOPMENT PROJECTS BEING  
CARRIED OUT AT THE FAA TECHNICAL CENTER AND IMPLEMENT RECOMMENDATIONS AS  
CONSIDERED APPROPRIATE.

REQUIREMENT: AIRPORTS OFFICE HAS REQUESTED A NUMBER OF RESEARCH PROJECTS  
RELATED TO THE DESIGN AND OPERATION OF A HELIPORT, SUCH AS:

- A. RESEARCH HELICOPTER PERFORMANCE FROM FLIGHT MANUALS.
- B. RESEARCH HELICOPTER REJECTED TAKEOFF REQUIREMENTS FROM FLIGHT MANUALS.
- C. INVESTIGATE PILOT PERFORMANCE OF CURRENT VFR APPROACHES.
- D. INVESTIGATE ROTOP DOWNWASH IMPACTS ON HELIPORT DESIGN.

MILESTONE SCHEDULE COMPLETION DATES: SCHED. REVISED ACTUAL

DATA COLLECTION (START) 01/01/87

STATUS: ALL PROJECTS ARE IN PROGRESS.

AVS RESUME

ARP-83-030-M

PROJECT TITLE: NATIONAL PROTOTYPE HELIPORT DEMONSTRATION & DEVELOPMENT  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIRPORTS PROGRAMS

RESUME DATE: 07/08/87 LAST REVISION: 09/30/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: BUSHEE, JIM, AAS-100 (202) 267-3446  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: SYSTEMATIC EVOLUTION OF FOUR PROTOTYPE HELIPORT FACILITIES FROM VFR ONLY CAPABILITY TO FULL IFR PRECISION APPROACH CAPABILITY BY THE 1987-88 TIMEFRAME.

REQUIREMENT: JOINT EFFORT WITH INDUSTRY TO ESTABLISH HELIPORT FACILITIES WITH FULL IFR PRECISION APPROACH CAPABILITY AND "ALL-WEATHER" HELIPORT CRITERIA AND STANDARDS BY CY-1989; FORMULATE A NATIONAL SYSTEM OF AT LEAST 25 URBAN, IFR, PUBLIC-USE HELIPORT FACILITIES BY THE YEAR 2000.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
EST. FAA/IND N. PRO. HELIPORT DEMO & DEV. PR	/ /		01/01/83
1ST NAT'L. PROTOTYPE DEMONSTRATION HELIPORT	/ /		01/01/85
1ST NAT'L. PRO. DEMO. HELIPORT W/NONPRE APPR.	/ /	01/01/87	08/01/85
1ST IFR NAT'L. PRO. DEMO. HELIPORT W/PRE APPR	01/01/83		
PUBLISH ALL-WEATHER HELIPORT DESIGN CRITERIA	01/01/88		
1ST PUB.-USE HELIPORT BUILT UNDER CRITERIA	01/01/89		
IFR HELI./TERM AREA/ROUTE STRUC. AT 5 CITIES	01/01/93		
IFR HELI./TERM AREA/RT. STRUC. AT 15 CITIES	01/01/96		
IFR HELI./TERM. AREA/RT. STRUC. AT 25 CITIES	01/01/20		

STATUS: AS PART OF THE FAA'S ROTORCRAFT MASTER PLAN, THE ALL-WEATHER HELIPORT DEVELOPMENT AND DEMONSTRATION PROGRAM WAS INITIATED IN THE FALL OF 1983. THIS EFFORT IS IN CONJUNCTION WITH INDUSTRY AND ADDRESSES THE ESTABLISHMENT OF ALL-WEATHER HELIPORT CRITERIA AND STANDARDS BETWEEN NOW\*

REMARKS/NOTES: THE FOUR LOCATIONS SELECTED WILL BE THE FIRST HELIPORT FACILITIES IN THE U.S. TO RECEIVE MICROWAVE LANDING SYSTEMS (MLS) AND AUTOMATED WEATHER OBSERVATION SYSTEMS (AWOS). EVALUATION OF NEW TECHNOLOGIES WILL BE ACCOMPLISHED AT THE NATIONAL CONCEPT DEVELOPMENT HELIPORT AT THE FAA'S TECHNICAL CENTER. AT THE CONCLUSION OF SUCCESSFUL TESTING AND CERTIFICATION, NEW SYSTEMS AND EQUIPMENT WILL BE MADE AVAILABLE FOR INSTALLATION AND OPERATIONAL USE AT THE NATIONAL PROTOTYPE DEMONSTRATION HELIPORTS. AS THE PROJECT PROGRESSES, THE FAA WILL WORK TO IMPLEMENT STEPS REQUIRED TO ESTABLISH FACILITIES WITH FULL IFR CAPABILITY. HOPEFULLY, THROUGH THIS EFFORT WE WILL SEE THE FRAMEWORK OF A NATIONAL NETWORK OF IFR HELIPORTS AND LOW-LEVEL AIRWAYS TO ACCOMMODATE THE AMERICAN ROTORCRAFT INDUSTRY BEFORE THE BEGINNING OF THE 21ST CENTURY.

\*AND CY-1989. THE FAA ANNOUNCED THE SELECTION OF FOUR COMMUNITIES TO SERVE AS CORE LOCATIONS FOR THE NATIONAL PROTOTYPE DEMONSTRATION HELIPORT PROGRAM IN OCTOBER 1983. THE CITIES ARE INDIANAPOLIS, IN; LOS ANGELES, CA; NEW ORLEANS, LA; AND NEW YORK, NY. AIP FUNDING OF APPROXIMATELY \$11 MILLION IS NEEDED. PROJECT TRANSFERRED TO ARP--PREVIOUSLY VS-220.

# AVS RESUME

ARP-86-031-11

PROJECT TITLE: INDIANAPOLIS DOWNTOWN HELIPORT  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIRPORTS PROGRAMS

RESUME DATE: 07/08/87 LAST REVISION: 07/08/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: MOTTLEY, JIM, APP-400 (202) 267-3451  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: SYSTEMATICALLY COLLECT AND ANALYZE DATA ON HELICOPTER  
OPERATIONS AT THE INDIANAPOLIS DOWNTOWN HELIPORT. \*

REQUIREMENT: THE FAA HAS EXPENDED FEDERAL FUNDS IN THE DEVELOPMENT OF  
THE PUBLIC-USE HELIPORT. THE AGENCY NEEDS TO ASSESS THE ECONOMIC AND  
ENVIRONMENTAL IMPACT TO DETERMINE FAA POLICY ON FUTURE EXPENDITURE OF  
FEDERAL FUNDS AND FAA RESOURCES IN THE DEVELOPMENT OF PUBLIC-USE  
HELIPORTS.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
DATA COLLECTION (START)	05/31/85		05/31/85*
DEVELOP ECONOMIC ANALYSIS	05/31/86	06/03/88	*

STATUS: NONE.

REMARKS/NOTES: THE SLIPPAGE IN MILESTONE SCHEDULE IS DUE TO OTHER FUNDING  
PRIORITIES. PROJECT TRANSFERRED TO ARP--PREVIOUSLY VS-221.

AVS RESUME

ARP-86-032-M

PROJECT TITLE: NEW ORLEANS HELIPORT  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN AIRPORTS PROGRAMS

RESUME DATE: 07/08/87 LAST REVISION: 07/08/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: MOTTLEY, JIM, APP-400 (202) 267-3451  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: SYSTEMATICALLY COLLECT AND ANALYZE DATA ON HELICOPTER OPERATIONS AT THE NEW ORLEANS HELIPORT. \*

REQUIREMENT: THE FAA HAS EXPENDED FEDERAL FUNDS IN THE DEVELOPMENT OF THE PUBLIC-USE HELIPORT. THE AGENCY NEEDS TO ASSESS THE ECONOMIC AND ENVIRONMENTAL IMPACT TO DETERMINE FAA POLICY ON FUTURE EXPENDITURE OF FEDERAL FUNDS AND FAA RESOURCES IN THE DEVELOPMENT OF PUBLIC-USE HELIPORTS.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL	
DATA COLLECTION (START)	03/31/86			
DEVELOP ECONOMIC ANALYSIS	05/31/86	06/30/88		*

STATUS: NONE.

REMARKS/NOTES: THE SLIPPAGE IN MILESTONE SCHEDULE IS DUE TO OTHER FUNDING PRIORITIES. PROJECT TRANSFERRED TO ARP--PREVIOUSLY VS-222. \*

**POLICY AND INTERNATIONAL PROGRAMS**

## POLICY AND INTERNATIONAL SUMMARY

### 1. Major Accomplishments Include:

- (1) The FAA has actively supported rotorcraft noise reduction programs since 1973, including a wide-ranging industry/Government noise measurement and evaluation program. In 1981, it was decided that program should be accelerated and that a substantial NASA/Army/FAA/industry noise research program should be initiated. That program is being coordinated from the NASA Langley Research Center and involves a total resource commitment from all the parties involved in excess of \$20 million over 5 years.
- (2) Since 1975, the FAA has measured the noise from domestic and foreign manufactured helicopters in support of ICAO rulemaking on noise standards. The data have been used both by FAA and industry to form the basis for the U.S. position for helicopter rulemaking activity. Some of the most recent Noise Measurement Reports are:

#### Noise Measurement Flight Test: Data/Analyses

- o Bell 222 Twin Jet (Report No. FAA-EE-84-1)
  - o Aerospatiale SA 365N Dauphin 2 (Report No. FAA-EE-84-2)
  - o Hughes 500 D/E (Report No. FAA-EE-84-3)
  - o Aerospatiale AS 355F Twin Star (Report No. FAA-EE-84-4)
  - o Aerospatiale AS 350D AStar (Report No. FAA-EE-84-5)
  - o Sikorsky S-76A (Report No. FAA-EE-84-6)
  - o Boeing Vertol 234/CH-47D (Report No. FAA-EE-84-7)
  - o ICAO Helicopter Noise Measurement Repeatability Program vs. Test Report (Report No. FAA-EE-85-6)
- (3) The FAA has participated in an international forum of evaluating ICAO standardized noise testing for helicopters.
  - (4) The FAA has also worked with manufacturers in developing noise abatement procedures.
  - (5) Helicopter noise levels were measured at several cities in the contiguous U.S. to obtain background information of noise levels associated with helicopter operations in the urban environment. Those reports currently available are:
    - o Helicopter Noise Exposure Curves for use in Environmental Impact Assessment (November 1982)—Report No. FAA-EE-82-16
    - o A Survey of Helicopter and Ambient Urban Noise Levels in Phoenix, Arizona (December 1982)—Report No. FAA-EE-82-20
    - o Helicopter Noise Survey at Selected New York City Heliports (March 1983)—Report No. FAA-EE-83-2

- o Helicopter Noise Survey Performed at Parker Center, Pasadena and Anaheim, California (February 10-14, 1983)—Report No. FAA-EE-83-5
- o Helicopter Noise Survey Conducted at Norwood, Massachusetts (April 27, 1983)—Report No. FAA-EE-83-6
- o Helicopter Noise Survey Performed at Las Vegas, Nevada (January 19-21, 1984)—Report No. FAA-EE-84-15
- o Helicopter Noise Survey for Selected Cities in the Contiguous United States (March 20, 1985)—Report No. FAA-EE-85-3.

(6) Advisory Circular (AC 150-5020-2) on how to assess noise impacts for new heliports was issued.

(7) A Heliport Community Response Study was completed that details reactions of individuals with respect to various modes of helicopter operations. The study is titled A Community Survey of Helicopter Noise Annoyance Conducted Under Controlled Noise Exposure Conditions.

(8) Technical and financial support were provided to NASA Langley on helicopter aeroacoustics.

(9) The FAA conducted its Eleventh Annual FAA Forecast Conference in February 1987.

## 2. Current Projects Include:

- (1) Measure and analyze heliport noise levels at a variety of urban and suburban heliports (see Resume API-82-012-M).
- (2) Estimate, from industry growth trends and from noise measurements, present and future noise impacts (see Resume API-82-020-M).
- (3) Develop appropriate heliport planning and siting evaluation for noise, including the development and validation of computerized noise contour methodology (See Resumes API-82-013-M, API-82-022-M, API-82-023-M, and API-82-024-M).
- (4) Development of software to evaluate compatible land use for public-use heliports (See Resume API-84-025-M).

## 3. Problems/Needs and Actions Being Taken:

The greatest needs of the rotorcraft industry in the area of noise are the development of an economically sensible noise abatement technology and the development and validation of a workable noise prediction methodology.

An additional need is for the FAA (working with the operators and local officials) to develop practical noise abatement operational procedures and routes for urban areas. This process is time-consuming and has been largely



handled on a case-by-case basis as the demands arise. The agency should supplement this type of action by working out generalized noise abatement advisory circulars and other guidance materials, as was done a decade ago for fixed-wing aircraft. This would also include heliport planning data and guidelines.

Also, to prepare meaningful plans and to establish priorities for rotorcraft programs, the FAA Office of Aviation Policy and Plans is preparing helicopter activity forecasts.

4. Agency Obligations/Responsibilities to Provide For Rotorcraft—What and How to Improve Support:

The FAA is obligated to develop and implement reasonable and practical regulations to promote the safe and orderly expansion of civil aviation. The agency is also responsible for providing technical assistance, guidance, and support. This can best be accomplished by close cooperative effort with all of the elements involved.

N	H	C	<u>Policy and International Programs (API)</u>	
	x	x	API-82-010-M	Helicopter Noise Development Program
	x		API-82-012-M	Urban Heliport Noise Measurement
	x		API-82-013-M	Heliport Site Assessment Methodology
	x	x	API-82-017-M	Part 36 Noise Certification Standard
	x	x	API-82-020-M	Community Noise Compatibility Planning Program
	x	x	API-82-022-M	FAR Part 150 Revision
	x	x	API-82-023-M	Computer Data Base Enhancement
	x	x	API-82-024-M	Heliport Noise Model For Microcomputers
	x		API-82-025-M	Evaluation of Compatible Land Use for Public-Use Heliports
x	x	x	API-83-030-M	Forecast Conference—Helicopter Fleet Outlook
x	x	x	API-83-060-M	Economic Analysis of Helicopter Operations

N = National Airspace System  
 H = Heliports  
 C = Certification

AVS RESUME

API-82-010-M

-----  
PROJECT TITLE: HELICOPTER NOISE DEVELOPMENT PROGRAM  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN POLICY AND INTERNATIONAL PROGRAMS  
-----

RESUME DATE: 03/05/87 LAST REVISION: 09/11/87 REACTIVATED:

-----  
STAFF: PRINCIPAL SPECIALIST: VANWYEN, HARVEY, AEE-110 (202) 267-3558 \*  
TEAM LEADER :  
WRITER/EDITOR :  
-----

OBJECTIVE: DEVELOP TECHNOLOGY TO PREDICT NOISE IMPACT OF ROTORCRAFT.  
SUPPORT TECHNOLOGY LEADING TO NOISE REDUCTION.  
DEVELOP CRITERIA FOR SITING URBAN AND SUBURBAN HELIPORTS.  
SUPPORT DEVELOPMENT OF NOISE ABATEMENT PROCEDURES.  
-----

REQUIREMENT: ROTORCRAFT NOISE IS PERCEIVED BY BOTH THE PUBLIC AND  
INDUSTRY AS AN OBSTACLE TO DEVELOPING AN ADEQUATE SYSTEM OF URBAN AND  
SUBURBAN HELIPORTS.  
-----

STATUS. NONE.  
-----

REMARKS/NOTES: THIS PROGRAM IS PART OF THE LONGER NATIONAL ROTORCRAFT  
NOISE REDUCTION PROGRAM WHICH TIES TOGETHER THE NOISE-RELATED ACTIVITIES  
OF NASA AND THE FAA WITH THE MANUFACTURING AND OPERATING PORTIONS OF THE  
ROTORCRAFT INDUSTRY. IN ADDITION TO NASA AND HELICOPTER MANUFACTURERS, THIS  
PROGRAM INTERFACES WITH LOCAL PLANNING AUTHORITIES, HELICOPTER OPERATORS,  
BUSINESS DEVELOPERS, AND CONSULTANTS.  
-----  
-----

# AVS RESUME

API-82-012-N

PROJECT TITLE: URBAN HELIPORT NOISE MEASUREMENT  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN POLICY AND INTERNATIONAL PROGRAMS

RESUME DATE: 03/05/87 LAST REVISION: 09/11/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: ALBERSHEIM, STEVE, AEF-110 (202) 267-3500  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: TO QUANTIFY HELICOPTER NOISE IMPACTS AROUND A VARIETY OF URBAN HELIPORTS.

REQUIREMENT: MEASURE THE EXTENT OF NOISE IMPACTS AROUND HELIPORTS AND DETERMINE THE PRACTICALITY OF MAKING SIGNIFICANT NOISE REDUCTION THROUGH CHANGES IN OPERATIONAL PROCEDURES.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
FINAL REPORT OF INITIAL SURVEYS	/ /		03/31/85
DRAFT REPORT OF ANALYSIS OF SURVEYS	/ /		02/28/85
INITIATE ADDITIONAL FIELD SURVEYS	02/28/86		
FINAL REPORT	07/31/86		

STATUS: ADDITIONAL FUNDING HAS NOT BEEN APPROVED. THIS RESUME IS CONTINUED IN THIS EDITION FOR ACCOUNTABILITY ONLY. IT WILL BE DELETED IN THE NEXT EDITION.

# AVS RESUME

API-82-013-M

PROJECT TITLE: HELIPORT SITE ASSESSMENT METHODOLOGY  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN POLICY AND INTERNATIONAL PROGRAMS

RESUME DATE: 03/05/87 LAST REVISION: 09/11/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: TEDRICK, DICK, AEE-3 (202) 267-3577 \*  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: DEVELOP SENSIBLE ENVIRONMENTAL CRITERIA FOR SITING NEW OR EXPANDED-USE HELIPORTS IN URBAN AREAS.

REQUIREMENT: THE FAA NEEDS TO PROTECT THE LEGITIMATE ENVIRONMENTAL AND ECONOMIC NEEDS OF BOTH THE PUBLIC AND INDUSTRY BY SETTING UNIFORM NATIONAL STANDARDS.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
INTERIM CRITERIA PUBLISHED (FAA/HAI)	/ /		12/31/83
ADVISORY CIRCULAR (AC-150/5020-2) PUBLISHED	/ /		12/31/83
REVISE ADVISORY CIRCULAR	08/31/85	02/28/86	

STATUS: PROJECT IS ON HOLD.

REMARKS/NOTES: INTERFACES HAVE INCLUDED THE HAI, AMERICAN PLANNING ASSOCIATION, AND THE NATIONAL LEAGUE OF CITIES AND COUNTIES. ADVISORY CIRCULAR 150/5020-2, NOISE ASSESSMENT GUIDELINES FOR NEW HELIPORTS, WAS PUBLISHED DECEMBER 9, 1983. REVISION OF THE CURRENT ADVISORY CIRCULAR TO EXPAND THE DATA BASE AND TO HELP CLARIFY THE METHODOLOGY SET FORTH IN THE AC -150-5020-2 SO IT IS MORE EASILY UNDERSTOOD.

# AVS RESUME

API-83-017-M

PROJECT TITLE: PART 36 NOISE CERTIFICATION STANDARD  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN POLICY AND INTERNATIONAL PROGRAMS

RESUME DATE: 03/09/87 LAST REVISION: 09/11/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: ALBERSHEIM, STEVE, AEE-110 (202) 267-3560 \*  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: TO DEVELOP A CERTIFICATION STANDARD THAT IS ECONOMICALLY REASONABLE AND TECHNOLOGICALLY PRACTICABLE.

REQUIREMENT: THE FAA IS OBLIGATED TO DEVELOP AND IMPLEMENT A REGULATION TO PROMOTE THE SAFE AND ORDERLY EXPANSION OF CIVIL AVIATION.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
DRAFT REGULATORY LANGUAGE	/ /		01/31/84
INITIATE REVIEW OF NPRM	/ /		04/30/84
ISSUE NPRM	05/31/84		
ISSUE RULE	06/30/85		

STATUS: FINAL RULE IS IN THE APPROVAL PROCESS. \*

REMARKS/NOTES: THE FAA HAS ACTIVELY SUPPORTED NOISE REDUCTION PROGRAMS FOR ALL ASPECTS OF THE CIVIL AIRCRAFT FLEET. THE PREVIOUS NPRM WAS WITHDRAWN BECAUSE OF ECONOMIC IMPACTS THAT WERE NOT ADEQUATELY ADDRESSED. THE FAA HAS BEEN WORKING WITH U.S. INDUSTRY AND ICAO/CAN TO IMPROVE THE RULE AND LOWER ECONOMIC IMPACTS. MILESTONE SLIPPAGE IS DUE TO OTHER HIGHER REGULATORY PRIORITIES.

AVS RESUME

API-82-020-M

-----  
PROJECT TITLE: COMMUNITY NOISE COMPATIBILITY PLANNING PROGRAM  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN POLICY AND INTERNATIONAL PROGRAMS  
-----

RESUME DATE: 03/10/87 LAST REVISION: 09/11/87 REACTIVATED:

-----  
STAFF: PRINCIPAL SPECIALIST: VANWYEN, HARVEY, AEE-110 (202) 267-3558 \*  
TEAM LEADER :  
WRITER/EDITOR :  
-----

OBJECTIVE: DEVELOP SUBSTANTIATED METHODS AND PROCEDURES FOR NOISE  
PREDICTION AND COMPATIBILITY PLANNING FOR HELIPORTS AND HELIPADS.  
MAINTAIN PROPER BALANCE BETWEEN NOISE REDUCTION BENEFITS AND COSTS.  
-----

REQUIREMENT: THIS PROGRAM SUPPORTS LONG-TERM AGENCY GOALS TO ENCOURAGE  
THE ORDERLY GROWTH OF CIVIL AVIATION WHILE MINIMIZING COSTLY REGULATION.  
-----

STATUS: NONE.  
-----

REMARKS/NOTES: THIS PROGRAM WILL DEVELOP COMPUTERIZED TOOLS FOR ASSESSING  
THE NOISE IMPACTS OF HELICOPTER OPERATIONS AT HELIPORTS AND OTHER AIRPORTS  
AND FOR DETERMINING THE SYSTEM-WIDE COSTS OF FEDERAL OR LOCAL REGULATIONS  
LIMITING THOSE OPERATIONS FOR ENVIRONMENTAL PURPOSES. THIS PROGRAM WILL HAVE  
WIDE-RANGING INTERACTIONS WITH STATE AND LOCAL AVIATION, COMMUNITY PLANNERS,  
ENVIRONMENTAL ORGANIZATIONS, AND THE GENERAL PUBLIC.  
-----  
-----

AVS RESUME

API-82-022-M

PROJECT TITLE: FAR PART 150 REVISION  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN POLICY AND INTERNATIONAL PROGRAMS

RESUME DATE: 03/12/87 LAST REVISION: 09/11/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: HIXSON, ROBERT, AEE-110 (202) 267-3565  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: TO REVISE FEDERAL AVIATION REGULATIONS (FAR) PART 150 TO INCLUDE HELIPORTS AND HELIPADS.

REQUIREMENT: AT THE PRESENT TIME, HELIPORTS/HELIPADS ARE NOT INCLUDED IN FAR PART 150 ANALYSES.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
ISSUE NOISE ABATEMENT ADVISORY CIRCULAR	/ /		10/31/83
INITIATE PART 150 REVISION	/ /		05/31/84
ISSUE NPRM	06/30/85		11/04/86
ISSUE RULE	06/30/86	03/31/88	

STATUS: A DRAFT FINAL RULE IS IN PROCESS.

REMARKS/NOTES: FAR PART 150 CONTAINS THE REQUIREMENTS FOR PREPARING NOISE EXPOSURE MAPS AND NOISE COMPATIBILITY PROGRAMS. BY LAW, SUCH MAPS AND PROGRAMS ARE PREREQUISITES FOR FUNDING OF NOISE CONTROL PROJECTS OUT OF TRUST FUND MONIES. AS APPROPRIATE, NOISE METRICS AND SITING CRITERIA ARE DEVELOPED FOR HELICOPTERS AND HELIPORTS--REQUIREMENTS CAN BE DEVELOPED FOR NOISE CONTROL AROUND HELIPORTS AND HELIPADS. THESE REQUIREMENTS MAY BE INCLUDED IN FAR PART 150 SOMETIME AFTER 1988.



PROJECT TITLE: COMPUTER DATA BASE ENHANCEMENT  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN POLICY AND INTERNATIONAL PROGRAMS

RESUME DATE: 03/12/87 LAST REVISION: 09/11/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: SELLMAN, ED, AEE-120 (202) 267-3559 \*  
TEAM LEADER : \*  
WRITER/EDITOR :

OBJECTIVE: TO ASSEMBLE A ROTORCRAFT NOISE DATA BASE SUITABLE FOR  
THE AGENCY'S HELIPORT NOISE MODEL (HNM) COMPUTER PROGRAM AND TO BE USED IN  
THE MODEL OUTLINED IN RESUME API-82-024-M.

REQUIREMENT: BETTER DATA AND DATA ON A WIDER VARIETY OF HELICOPTERS ARE  
NEEDED TO SUPPORT NOISE CONTOUR MODELING.

STATUS: COMPLETED AS OF APRIL 1987. THIS RESUME IS CONTINUED IN  
THIS EDITION FOR ACCOUNTABILITY ONLY. IT WILL BE DELETED IN THE NEXT  
EDITION.

REMARKS/NOTES: FIELD MEASUREMENTS OF NOISE VERSUS SLANT RANGE WILL BE MADE  
FOR A VARIETY OF HELICOPTERS. THIS RESUME WAS REVISED TO REFLECT THE WORK  
TO BE USED IN RESUME API-82-024-M.

AVS RESUME

API-82-024-M

PROJECT TITLE: HELIPORT NOISE MODEL FOR MICROCOMPUTERS  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN POLICY AND INTERNATIONAL PROGRAMS

RESUME DATE: 03/12/87 LAST REVISION: 07/06/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: CONNOR, THOMAS, AEE-120, (202) 267-3570  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: DEVELOPMENT OF A COMPUTER MODEL TO BE USED WITH A MICROCOMPUTER FOR SPECIFIC EVALUATION OF HELISTOPS/HELIPORTS.

REQUIREMENT: AS THE USE OF HELICOPTERS BECOMES MORE WIDESPREAD IN THE URBAN AREA, PLANNERS WILL NEED A TOOL TO ASSESS THE NOISE IMPACT FROM THESE OPERATIONS. THE DEVELOPMENT OF A DESK-TOP COMPUTER MODEL WILL ENABLE THE PUBLIC AND INDUSTRY TO BETTER EVALUATE THE IMPACTS AND ECONOMIC CONSIDERATION.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
PROTOTYPE MODEL	06/30/84		04/10/87*
FINAL MODEL	03/31/85	11/15/87	*

STATUS: CONTRACT AWARDED SEPTEMBER 1985 TO PROCEED WITH DEVELOPMENT OF THE MODEL.

REMARKS/NOTES: THIS WILL ALLOW NOISE ASSESSMENT AT HELIPORTS/HELISTOPS IN A LESS COSTLY AND COMPLEX PROGRAM THAN THE INM WHICH ONLY ADDRESSES THE MIX OF HELICOPTERS AND AIRPLANES AT AIRPORTS. MILESTONE SLIPPAGE IS DUE TO OTHER AGENCY BUDGET PRIORITIES.

# AVS RESUME

API-84-025-M

PROJECT TITLE: EVALUATION OF COMPATIBLE LAND USE FOR PUBLIC-USE  
HELIPORTS  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN POLICY AND INTERNATIONAL PROGRAMS

RESUME DATE: 03/13/87 LAST REVISION: 07/06/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: ALBERSHEIM, STEVE, AEE-110 (202) 267-3560 \*  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: TO EVALUATE COMPATIBLE LAND USE AND NOISE ASSOCIATED WITH  
PUBLIC-USE HELIPORTS.

REQUIREMENT: DEVELOPMENT OF A CRITERIA LIST FOR COMPATIBLE LAND USE  
AROUND HELIPORTS AND SOFTWARE TO ASSESS IMPACTS IN ORDER TO PROVIDE  
GUIDANCE TO PLANNERS FOR THE SITING OF PUBLIC-USE HELIPORTS.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
INITIATE STUDY	/ /		11/30/84
DRAFT REPORT	01/31/86	08/31/87	*
FINAL REPORT	05/31/86	12/31/87	*
SOFTWARE DEVELOPMENT (PROTOTYPE MODEL)	/ /		09/30/85
FINAL DEVELOPMENT OF SOFTWARE	05/31/86		10/31/86*

STATUS: PROGRAM IS PROGRESSING ON SCHEDULE.

REMARKS/NOTES: THE SOFTWARE PACKAGE TO ASSIST PLANNERS IN SITING A  
PUBLIC-USE HELIPORT WHILE CONSIDERING NOISE IMPACTS WILL BE PART OF  
ANOTHER MODEL FOR HELICOPTER NOISE. \*

AVS RESUME

API-83-030-M

PROJECT TITLE: TWELFTH ANNUAL FAA AVIATION FORECAST CONFERENCE \*  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN POLICY AND INTERNATIONAL PROGRAMS

RESUME DATE: 07/06/87 LAST REVISION: 07/08/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: MERCER, GENE, APO-110 (202) 267-3355  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: TO PROVIDE AN INDUSTRY FORUM FOR REVIEWING FUTURE  
DIRECTION IN AVIATION GROWTH.

REQUIREMENT: NEED FOR IMPROVING HELICOPTER FORECASTING CAPACITY.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
SESSION ORGANIZATION	/ /		10/30/86*
CONFERENCE	/ /		02/20/87*
DOCUMENT	03/31/86		02/28/87*

STATUS: THE DOCUMENT DESCRIBING THE TWELFTH ANNUAL FORECAST \*  
CONFERENCE WAS DISTRIBUTED ON SCHEDULE. THIS CONFERENCE IS HELD ON A  
YEARLY BASIS. THIS IS A CONTINUING PROGRAM.

REMARKS/NOTES: COMPLETED FOR 1987.

# AVS RESUME

API-83-060-M

PROJECT TITLE: ECONOMIC ANALYSIS OF HELICOPTER OPERATIONS  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN POLICY AND INTERNATIONAL PROGRAMS

RESUME DATE: 03/12/87 LAST REVISION: 09/30/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: HOFFER, STEFAN, APO-220, (202) 267-3308  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: ESTIMATE THE COST/EFFECTIVENESS ENVELOPE FOR HELICOPTER OPERATIONS. ENVELOPE PARAMETERS INCLUDE: LIFE CYCLE COSTS, OPERATING COSTS, RANGE, BENEFITS INCLUDING VALUE OF TIME, CONVENIENCE, AND ENVIRONMENTAL IMPACTS.

REQUIREMENT: ESTABLISHES REALISTIC REGIME FOR PLANNING HELICOPTER FACILITIES.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
RFP ISSUE	/ /		05/31/83
PROPOSALS RECEIVED	/ /		06/30/83
CONTRACTOR SELECTED	/ /		09/30/83
FINAL REPORT (LOW ALT/COMM/NAV/SURV STUDY)	05/08/87		07/31/86

STATUS: INTERIM/PHASE I REPORT HAS NOT BEEN PUBLISHED TO DATE.  
REPORT AVAILABLE INTRA-AGENCY. \*

# **DEVELOPMENT AND LOGISTICS PROGRAMS**

## Development and Logistics Summary

### 1. Major Accomplishments Include:

(1) Awarded a contract (5-year period of performance with a \$5 million ceiling) for support of the Helicopter Program over the full range of the Development and Logistics (ADL) portion of the Rotorcraft Master Plan.

(2) Rotorcraft Flight Operations and Procedures Support (Resume ADL-82-010-M)

- Completed data collection to determine optimum MLS sensitivity for collocated MLS operations. Completed collocated MLS TERPS data collection for basic (straight-in, 60 knots constant speed to DH, single pilot, raw data) heliport approaches and departures.
- Awarded a contract to upgrade the FAA S-76 helicopter to reflect the capabilities of newer aircraft in the fleet.
- Completed a cooperative project with NASA assessing the feasibility of simulator use to establish part of the data base required to support TERPS development.
- Completed data collection for "shuttle holding pattern" TERPS using MLS for azimuthal guidance.
- Completed the collection of additional TERPS data for MLS approaches to heliports at higher angles and Vmini approach.
- Completed the definition of MLS critical areas for facilities installed at heliports.
- Completed data reduction and integration procedures for performing joint fixed-wing/rotary-wing flight inspection in preparation for the commissioning flight inspection of a heliport MLS.

(3) Rotorcraft ATC (Resume ADL-82-020-M)

- Developed basic ATC training materials on helicopters and helicopter operations.
- Initiated a project to collect and analyze helicopter wake vortex and downwash data for use in the revision of ATC separation standards (helicopter/helicopter and helicopter/airplane).
- Completed a project in support of air traffic planning for the implementation of MLS in terminal areas.
- Completed phase 1 of a cost/benefit analysis of alternatives

for providing improvements to low altitude navigation, communication, and surveillance services.

(4) Rotorcraft Weather (Resume ADL-82-030-M)

- Completed a study of weather deterioration patterns and analysis of current weather-related rules for instrument operations.
- Deployed automated weather observing system (AWOS) demonstrators at Indianapolis and FAA Technical Center heliports to study heliport AWOS siting criteria and operational suitability.
- Completed a study to define siting standards for installation of AWOS at heliports.
- Completed a demonstration of the operational suitability of the AWOS at heliports.
- Published an advisory circular defining a method of obtaining FAA design certification of a non-federal AWOS and certified the first such system using this method.
- Initiated a cooperative effort with National Weather Service to develop short-term aviation weather forecasting algorithms for future use with AWOS. Completed algorithm development and started validation.

(5) Rotorcraft Communications (Resume ADL-82-040-M)

- Developed and deployed systems to improve low-altitude/remote-area communications for helicopter users in selected geographic areas.
- Completed efforts to provide guidance to users and FAA facility planners to improve low-altitude VHF communications service.

(6) Rotorcraft TCAS (Resume ADL-82-050-M)

- Completed effort to define helicopter user needs and preferences related to TCAS use.
- Evaluated the suitability of TCAS for use in helicopter operations and developed modified design/performance standards for helicopter TCAS.
- Completed TCAS surveillance studies in Bell 206 and Sikorsky S-76 helicopters.

(7) Rotorcraft Low-Altitude Surveillance (Resume ADL-82-060-M)

- Developed operational interfaces for receiving, processing, and displaying automatic dependent surveillance data on the ATC displays in the Houston Center.



- Initiated an evaluation of the accuracy of LORAN flight following (LOFF) in comparison with en route radar.
- (8) Rotorcraft Navigation/Landing (Resume ADL-82-070-M)
- Supported the certification of LORAN-C for en route use by helicopters and the associated reduction of offshore route widths from 100 nm to 8 nm.
  - Supported development and certification of airborne radar approaches (ARA) for rotorcraft nonprecision approaches based on airborne weather radar in the ground mapping mode.
  - Completed a study to define siting standards for installation of microwave landing system (MLS) at heliports.
  - Completed an evaluation of LORAN-C VNAV use in a helicopter in support of the development of new, minimum operational performance standards (MOPS).
  - Collected GPS data in the Hudson/East River areas of New York City at low altitudes for the evaluation of signal integrity and the effects of different satellite positions on signal accuracy.
  - Developed a prototype MLS RNAV and used it to develop helicopter applications of this technology. This effort has supported efforts to develop minimum operational performance standards (MOPS) for MLS RNAV.
  - Completed 1-year data collection of LORAN-C stability in the Gulf of Mexico and flight data collection of pilotage error information to support certification of LORAN-C for nonprecision approaches.
- (9) Heliport Planning and Design Criteria (Resume ADL-82-080-M)
- Completed construction of a National Concept Development Heliport at the FAA technical Center. Installed at this IFR heliport are MLS, AWOS, and IFR heliport lighting.
  - Completed a cooperative program with DOD for the development of a standard helipad lighting system.
  - Completed simulation testing of proposed heliport approach light system configurations.
  - Completed a joint project with the FAA Eastern Region to demonstrate use of MLS at Battery Park Heliport in New York City.

- Initiated an effort to validate the obstruction clearance surfaces (approach and departure) in the FAA advisory circular on heliport design.
- Initiated an effort to validate the minimum dimensions required for helicopter parking areas and taxiways in the FAA advisory circular on heliport design.

(10) Rotorcraft Airworthiness and Flying Qualities (Resume ADL-82-090-M)

- Completed a study of missed approach performance supporting the S-76 certification at an airspeed ( $V_{\text{mini}}$ ) of 40 knots.
- Completed an operational survey and accident analysis to identify the hazards of rotorcraft operations and the root causes of rotorcraft accidents.
- Established agreements with NAE (Canada) for handling qualities.
- Completed a preliminary investigation at NAE (Canada) of handling qualities requirements for rotorcraft instrumentation flight during decelerating approach maneuvers and overshoot.
- Completed a study to determine the effects of flight directors and control system augmentation on pilot workload during steep decelerating rotorcraft approaches in IMC.

(11) Rotorcraft Icing (Resume ADL-82-100-M)

- Supported icing certification activities in the Rotorcraft Certification Directorate (AC 29-2).
- Developed the definition of the icing environment in supercooled clouds below 10,000 feet.
- Established an interagency agreement with NASA to develop simulation tools.
- Published a technical report on improvements in ground deicing technology and procedures.

(12) Rotorcraft Crashworthiness/Structural Airworthiness (Resume ADL-82-110-M)

- Established a joint effort with DOD and developed several crashworthy cabin concepts using composites.

- Completed work to define the rotorcraft crash environment and review existing crashworthiness technology.
- Completed the development of an advisory circular for occupant restraint.

(13) Rotorcraft Obstruction Avoidance (Resume ADL-83-120-M)

- Initiated preparation of a program plan for systematic study of alternatives for preventing rotorcraft collisions with obstacles.

(14) Rotorcraft Atmospheric Electrical Hazards (Resume ADL-85-130-M)

- Published a handbook addressing aircraft lightning protection.
- Developed material which was used as a basis for guidelines for the certification of digital systems and produced a digital systems handbook.
- Published a draft geographic study of lightning strike data.
- Published a report covering the 1987 Direct Strike Lightning data gathering effort.

(15) Rotorcraft Human Behavior (Resume ADL-85-150-M)

- Developed a training manual on aeronautical decisionmaking for helicopter pilots. Voluntary use of this manual is expected to help reduce the number of pilot error accidents.

2. Future Plans Include:

(1) Rotorcraft Flight Operations and Procedures Support (Resume ADL-82-010-M)

- Collect TERPS data to support the full use of MLS, LORAN-C, Global Positioning System, and other NAVAIDS.
- Collect TERPS data for flight director, coupled, and decelerating steep approaches and complex MLS/RNAV procedures.
- Quantify, via simulation and flight testing, the extent to which MLS (collocated) TERPS constraints can be decreased in the visual segment of a precision approach to a heliport.
- Develop the capability to generate portions of the data base required for TERPS development using simulators.

- Develop criteria and mechanism to handle newer generation rotorcraft and their capabilities for low-speed IFR operations.

(2) Rotorcraft ATC (Resume ADL-82-020-M)

- Develop tools and methodologies (e.g., simulation) for the preparation of specific ATC procedures for rotorcraft.
- Initiate an effort to review and modify the Northeast Corridor helicopter routes and to develop recommendations for national standards for low-altitude helicopter routes.
- Collect and analyze data on helicopter wake vortex/downwash effects and recommend appropriate ATC separation standards.
- Establish plan and justification for low-altitude communications/navigation/surveillance service improvements based on cost/benefit analysis. Address needs of air ambulance helicopter operations in particular.

(3) Rotorcraft Weather (Resume ADL-82-030-M)

- Define requirements for low-altitude, short-term forecasts (including icing) better suited for rotorcraft operations.
- Continue to support projects to enhance the quality and availability of weather information for rotorcraft operations in joint efforts with the National Weather Service and other agencies.

(4) Rotorcraft Communications (Resume ADL-82-040-M)

- Define implementation options and provide for future improvement of low-altitude communications service.

(5) Rotorcraft Traffic-Alert Collision Avoidance System (TCAS) (Resume ADL-82-050-M)

- Complete final documentation of TCAS evaluation on the S-76.

(6) Rotorcraft Low-Altitude Surveillance (Resume ADL-82-060-M)

- Develop the means to augment low-altitude surveillance coverage.
- Develop full, low-altitude aircraft tracking capability, including related procedures and sufficient level of automation to support direct, random routing for rotorcraft.

- Define implementation options and provide for future improvement of low-altitude surveillance service.
- (7) Rotorcraft Navigation/Landing (Resume ADL-82-070-M)
- Continue to develop new capabilities involving rotorcraft navigation in the en route and terminal environments.
  - Define implementation options and provide for future improvement of low-altitude navigation service.
- (8) Heliport Planning and Design Criteria (Resume ADL-82-080-M)
- Rigorously validate the obstruction clearance surfaces in the FAA advisory circular on heliport design.
  - Rigorously validate the minimum dimensions required for helicopter parking areas and taxiways in the FAA advisory circular on heliport design.
  - Evaluate all technical elements associated with IFR heliports and develop recommendations on heliport design standards.
  - Develop recommendations for national guidelines on heliport planning.
  - Validate helicopter IFR approach lighting simulation test results by conducting actual weather IFR/MLS approaches to the Concept Development Heliport at the FAA Technical Center.
- (9) Rotorcraft Airworthiness and Flying Qualities (Resume ADL-82-090-M)
- Define the minimum equipment required for steep decelerating rotorcraft approaches in IMC.
  - Evaluate advanced flight control systems/technology (fly-by-wire) to establish standards which can be used during the certification process.
  - Evaluate electronic display systems (CRT) for certification/compliance issues related to display clutter, format, location, and configuration.
  - Evaluate various low-visibility aids such as forward looking infrared (FLIR) and low-level video for use during landings in IMC.

- Develop a data base establishing criteria and standards for advanced control/display systems for near zero/zero visibility landing conditions at heliports.
- Continue to provide expertise and methods to tap extensive research and development community resources and ability to capitalize on related activities.

(10) Rotorcraft Icing (Resume ADL-82-100-M)

- Develop improved definitions of low-altitude atmospheric environment under various meteorological conditions which include snow, freezing rain, and mixed conditions for the establishment of realistic icing certification requirements.
- Provide the infrastructure for efficient icing simulation and test procedures to support certification activities.
- Develop improved techniques and procedures (analysis and simulation) which can be used during the certification process.
- Provide icing instrumentation calibration standards.

(11) Rotorcraft Crashworthiness/Structural Airworthiness (Resumes ADL-82-110-M)

- Evaluate advanced technology design techniques and materials (composite) to establish a data base which can be used by the airworthiness specialist during the certification process.
- Evaluate damage tolerant structures and designs to establish specifications and standards.
- Develop analytical/model testing techniques which can be used during the certification process.

(12) Rotorcraft Obstruction Avoidance (Resume ADL-83-120-M)

- Initiate studies on rotorcraft obstruction collisions as related to crashworthiness issues on crash dynamics, seat/stretcher restraint systems, occupant evacuation, and escape procedures.
- Evaluate alternatives for improving low-altitude flight safety including new operational procedures, additional avionics, crashworthiness, and crew training.
- Develop new techniques to mark, light, detect, and protect against collision with obstructions.

- Determine the best mix of measures to achieve an overall level of desired safety, at lowest cost, for low-level, visual operations such as air ambulance rotorcraft missions.

(13) Rotorcraft Atmospheric Electrical Hazards (Resume ADL-85-130-M)

- Use data obtained from the airborne direct strike lightning strike program to develop the lightning hazard model.
- Establish the lightning strike zones for various configurations of rotorcraft.
- Establish protection criteria for flight critical/essential electronic flight control systems which will include software reliability assessment.

(14) Simulator Validation (Resume ADL-85-140-M)

- Develop the necessary criteria and guidance material to permit FAA certification of helicopter simulators to enhance helicopter pilot training and certification.

(15) Rotorcraft Human Behavior (Resume ADL-85-150-M)

- Develop a training manual on aeronautical decisionmaking specifically directed toward air ambulance pilots, operators, and hospital administrators.
- Evaluate human factors issues related to the use of advanced rotorcraft displays and associated controls for use in decelerating approaches to heliports.
- Establish the relationship between fatigue, stress, rotorcraft cockpit design and crew-duty times.

4. Agency Obligations/Responsibilities to Provide for Rotorcraft--What and How to Improve Support

- (1) Define rotorcraft needs and problems through dialogue with agency operating services, industry, and the public, and to enhance agency responsiveness to defined requirements.
- (2) Establish ADL programs which result in rotorcraft-related improvements for industry and the public. Strong emphasis will continue to be placed on safety and efficiency improvements, however, continued emphasis will be placed on the agency's role of fostering aviation.

- (3) Capitalize on the unique relationships between ADL and other elements of technical community to form synergisms.
- (4) Develop systems for the implementation of safety and service improvements to enhance the integration of rotorcraft into the NAS. The goal is to permit rotorcraft to operate safely and efficiently under all conditions in which the fixed-wing industry will operate.



N	H	C	<u>Development and Logistic Programs (ADL)</u>
x	x		ADL-82-010-M Rotorcraft Flight Operations and Procedures Support
x	x		ADL-82-020-M Rotorcraft ATC
x	x		ADL-82-030-M Rotorcraft Weather
x	x		ADL-82-040-M Rotorcraft Communications
x		x	ADL-82-050-M Rotorcraft Traffic-Alert Collision Avoidance System
x			ADL-82-060-M Rotorcraft Low-Altitude Surveillance
x		x	ADL-82-070-M Rotorcraft Navigation/Landing
x	x		ADL-82-080-M Heliport Planning and Design Criteria
		x	ADL-82-090-M Rotorcraft Airworthiness and Flying Qualities
		x	ADL-82-100-M Rotorcraft Icing
		x	ADL-82-110-M Rotorcraft Crashworthiness/Structural Airworthiness
x	x	x	ADL-83-120-M Rotorcraft Obstruction Avoidance
		x	ADL-85-130-M Rotorcraft Atmospheric Electrical Hazards
		x	ADL-85-140-M Simulator Validation
		x	ADL-85-150-M Rotorcraft Human Behavior

N = National Airspace System  
 H = Heliports  
 C = Certification

AVS RESUME

ADL-82-010-M

PROJECT TITLE: ROTORCRAFT FLIGHT OPERATIONS AND PROCEDURES SUPPORT  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN DEVELOPMENT AND LOGISTICS PROGRAMS

RESUME DATE: 03/18/87 LAST REVISION: 09/10/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: BILLMAN, BARRY ACT-140, (609) 484-6608  
TEAM LEADER : SMITH, R APM-450 (202) 267-3783  
WRITER/EDITOR :

OBJECTIVE: TO PROVIDE DATA BASE FOR REVISION OF CHAPTER 11 OF THE TERMINAL INSTRUMENT PROCEDURES MANUAL. INVOLVES REPRESENTATIVE HELICOPTERS/ VARIOUS SYSTEMS AT FAA TECHNICAL CENTER, USE SUBJECT PILOTS ON INSTRUMENTED RANGE, AND COMPILE DATA AND RESULTS FOR HANDOFF TO THE OFFICE OF FLIGHT STANDARDS AND THE AVIATION STANDARDS NATIONAL FIELD OFFICE. ALSO, INCLUDES LONGER TERM OBJECTIVES TO USE SIMULATOR DATA FOR TERPS DEVELOPMENT AND PROVIDE A PORTABLE SYSTEM TO PERMIT HELIPORT FLIGHT INSPECTION AND COLLECTION OF TERPS DATA FROM PRIVATE SECTOR ROTORCRAFT.

REQUIREMENT: INDUSTRY EXPRESSED NEED TO REVISE TERPS AND ESTABLISH DATA USING NAV/LANDING SYSTEMS AND NEWER ROTORCRAFT, WHICH WILL OPERATE AT LOWER SPEEDS, STEEPER DESCENTS, ETC. A CONTINUOUS INTRODUCTION OF NEW SYSTEMS AND ROTORCRAFT WILL REQUIRE THE AGENCY TO ADDRESS THE NEED FOR REVISED TERPS AND CRITERIA TO GRANT PRIVILEGES COMMENSURATE WITH CAPABILITY.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
MLS BASIC TERPS DATA COLLECTION COMPLETE	/ /		12/31/84
PREL. LORAN C TERPS DATA COLLECTION COMPLETE	/ /		12/31/84
ADVANCED TERPS DATA COLLECTION START	01/31/85	01/31/86	08/31/86
MLS FLIGHT INSPECTION (PHASE I) COMPLETE	03/31/86		10/30/86*
HOLDING PATTERN TERPS DATA COLLECTION	01/31/86		10/30/86*
DECELERATING TERPS (PHASE I) DATA COLLECTION	06/30/86	10/30/87	

STATUS: THE FAA HAS AWARDED A CONTRACT TO UPGRADE THE AGENCY'S S-76 HELICOPTER TO REFLECT THE CAPABILITIES OF NEWER AIRCRAFT IN THE FLEET. THE FAA HAS DECIDED NOT TO PURSUE WORK ON 2-CUE AND 3-CUE FLIGHT DIRECTORS.

REMARKS/NOTES: ADVANCED TERPS INCLUDE MLS RNAV, FLIGHT DIRECTOR, COUPLED APPROACH, AND DECELERATING APPROACH DATA COLLECTION. MLS REQUIRED FOR FAA TECHNICAL CENTER HELIPORT. THIS EFFORT RESPONDS TO REQUIREMENTS IDENTIFIED IN RESUMES UNDER AVS-82-020-M.

AVS RESUME

ADL-82-020-M

PROJECT TITLE: ROTORCRAFT ATC

PROJECT CATEGORY: ROTORCRAFT MASTER PLAN DEVELOPMENT AND LOGISTICS PROGRAMS

RESUME DATE: 03/18/87

LAST REVISION: 09/10/87

REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: HWOSCHINSKY, PETER, APM-450, (202)267-8531

TEAM LEADER : WEISS, R

APM-450 (202)267-8535 \*

WRITER/EDITOR :

OBJECTIVE: TO PROVIDE TECHNICAL METHODOLOGIES, TOOLS, AND DATA BASE TO SUPPORT IMPROVEMENTS TO THE ATC SYSTEM FOR FULLER INTEGRATION OF ROTORCRAFT INTO THE NAS. THIS INCLUDES WORK WITH ATC SIMULATION, SPECIAL ROUTES, AND IMPROVED ATC SEPARATION STANDARDS BASED ON WAKE VORTEX AND DOWNWASH. ALSO INCLUDES A COST/BENEFITS ANALYSIS TO DETERMINE THE EXTENT AND BEST METHODS TO IMPROVE LOW ALTITUDE COMMUNICATION, NAVIGATION, AND SURVEILLANCE ATC SERVICES.

REQUIREMENT: METHODOLOGIES, TOOLS, TECHNIQUES, AND DATA BASE NEEDED TO DEVELOP EFFICIENT PROCEDURES AND CRITERIA FOR ATC OF HELICOPTERS. IN CASES WHERE AN ATTEMPT IS MADE TO INTEGRATE HELICOPTERS INTO THE NAS, FAA PROVISIONS ARE CURRENTLY MADE ON A FRAGMENTED, CASE-BY-CASE BASIS, WITH LIMITED METHODOLOGIES, TOOLS, AND DATA.

MILESTONE SCHEDULE

COMPLETION DATES: SCHED. REVISED ACTUAL

ATC MLS TERMINAL AREA STUDIES START	/ /		08/31/84*
ATC MLS TERMINAL AREA STUDIES COMPLETED	12/31/86		12/31/85*
SPECIAL ROUTES STUDY START	12/31/83	12/31/87	
SPECIAL ROUTES STUDY COMPLETED	06/30/86	06/30/89	
PREL. WAKE/VORTEX/DOWNWASH TESTS START	/ /		03/31/84
PREL. WAKE/VORTEX/DOWNWASH TESTS COMPLETED	12/31/85	08/31/86	01/15/87
PHASE II WAKE VORTEX/DOWNWASH TESTS START	08/30/87		09/09/87*
PHASE II WAKE VORTEX/DOWNWASH TESTS COMPLETED	12/31/88		
LOW ALT. COST/BENEFIT ANALYSIS PHASE I START	/ /		08/31/83*
LOW ALT. COST/BENEFIT ANALYSIS PHASE I COMPL.	11/30/84	08/31/86	08/31/86*
LOW ALT. COST/BENEFIT ANALYSIS PHASE II START	10/30/87		*
LOW ALT. COST/BENEFIT ANALYSIS PHASE II COMPL	03/30/90		*

STATUS: THE FAA HAS DECIDED NOT TO PURSUE THE LOW-ALTITUDE POSITIVE CONTROL STUDY.

REMARKS/NOTES: THIS EFFORT SUPPORTS ACTIVITIES IDENTIFIED IN RESUMES ATO-82-011-M, ATO-82-012-M, ATO-82-013-M, ATO-82-014-M, AND ATO-82-016-M. WAKE VORTEX/DOWNWASH TEST EFFORT: AES-310 AND ACT-330.

PROJECT TITLE: ROTORCRAFT WEATHER  
 PROJECT CATEGORY: ROTORCRAFT MASTER PLAN DEVELOPMENT AND LOGISTICS PROGRAMS

RESUME DATE: 03/18/87 LAST REVISION: 09/10/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: IMBEMBO, STEPHEN, APM-650 (202) 267-8663  
 TEAM LEADER : SMITH, R APM-450 (202) 267-3783  
 WRITER/EDITOR :

OBJECTIVE: TO PROVIDE FOR AVAILABILITY OF APPROPRIATE METEOROLOGICAL INFORMATION FOR ROTORCRAFT OPERATIONS. INCLUDES ALL ACTIVITIES RELATED TO MAKING WEATHER INFORMATION MORE READILY AVAILABLE. DEVELOP SMALL, LOW-COST WEATHER OBSERVATION SYSTEM DESIGNS AND REQUIREMENTS FOR SHORTER TERM FORECASTS FOR ROTORCRAFT OPERATIONS ALSO PROVIDES IMPROVED DEFINITION OF HELICOPTER OPERATIONAL REQUIREMENTS FOR WEATHER INFORMATION.

REQUIREMENT: SMALL, LOW-COST WEATHER OBSERVATION SYSTEMS FOR HELIPORTS, SHORTER TERM FORECASTS MORE SUITED TO SHORTER MISSIONS, LOW ALTITUDES/REMOTE AREA OBSERVATIONS/FORECASTS, INCLUDING ICING. CURRENT OBSERVATIONS AND FORECASTS ARE FREQUENTLY NOT AVAILABLE IN MANY AREAS WHERE ROTORCRAFT OPERATE. SACRIFICES IN EFFICIENCY ARE OFTEN DIRECTLY ATTRIBUTABLE TO CONSTRAINTS INTRODUCED BY LIMITED AVAILABILITY OF FORECASTS OR OBSERVATIONS.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED. REVISED ACTUAL		
AWOS DEMO. UNIT INSTALLED-HOUMA, LA AIRPORT	/	/	08/31/85
AWOS DEMO. UNIT INSTALLED-FAA TECH CENTER	/	/	05/31/83*
AWOS DEMO. UNIT INSTALLED-INDIANAPOLIS, IN	/	/	12/31/85*
WEATHER OBSERVATION SYSTEM DESIGN COMPLETED	06/30/87	12/31/86	04/11/86
SHORT-TERM FORECASTING STUDY START-PHASE I	/	/	09/30/83
SHORT-TERM FORECASTING STUDY COMP.-PHASE I	/	/	12/31/85
NON-FEDERAL AWOS ADVISORY CIRCULAR PUBLISHED	/	/	04/11/86
FIRST NON-FEDERAL AWOS CERTIFIED	/	/	12/30/86

STATUS: DEMONSTRATION UNITS INSTALLED AT THE INDIANAPOLIS, IN, HELIPORT, AND THE FAA TECHNICAL CENTER HELIPORT. THE NATIONAL WEATHER SERVICE HAS ASSUMED THE RESPONSIBILITY FOR DEPLOYMENT OF AWOS. \*

REMARKS/NOTES: THIS EFFORT SUPPORTS ACTIVITIES IDENTIFIED IN ATO-82-015-M. FAA AWOS DEPLOYMENT HAS BEEN DELAYED DUE TO CONSTRUCTIONAL PROBLEMS.

# AVS RESUME

ADL-82-040-M

PROJECT TITLE: ROTORCRAFT COMMUNICATIONS  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN DEVELOPMENT AND LOGISTICS PROGRAMS

RESUME DATE: 03/18/87 LAST REVISION: 09/10/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: SMITH, ROBERT, APM-450, (202)267-3783  
TEAM LEADER : WEISS, R APM-450 (202)267-8535 \*  
WRITER/EDITOR :

OBJECTIVE: TO PROVIDE FOR RELIABLE COMMUNICATIONS IN ALL AREAS WHERE ROTORCRAFT OPERATE, WITH EMPHASIS ON IFR OPERATION SINCE COMMUNICATION IS A PREREQUISITE TO IFR OPERATIONS. TO DEVELOP SET OF TOOLS, TECHNIQUES, NEW CONCEPTS, NEW CAPABILITIES, AND SYSTEMS, AND TO ESTABLISH BASIS FOR IMPLEMENTATION. IMPROVEMENTS USING EXISTING VHF SYSTEM AND AVAILABLE EQUIPMENT, AND IMPROVEMENTS BASED ON NEW TECHNIQUES AND TECHNOLOGY (E.G., DATA LINK, SATELLITES).

REQUIREMENT: CONVENTIONAL VHF VOICE COMMUNICATION IS LIMITED TO LINE-OF-SIGHT; SERIOUS SHORTCOMINGS AT LOW ALTITUDES AND IN REMOTE AREAS. ALSO, DISSIMILARITIES BETWEEN ROTORCRAFT AND FIXED-WING AIRCRAFT AND ASSOCIATED OPERATIONS SHOULD BE ADDRESSED BY THE FAA. VOICE COMMUNICATIONS ARE REQUIRED AT LOW ALTITUDES NATIONWIDE. IN MANY AREAS, COVERAGE IS REQUIRED VIRTUALLY DOWN TO THE GROUND.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
A/C EQUIP. SELECTION/INSTALL'N STUDY COMPL.	/ /		12/31/84
A/G SYS. IMPROVEMENT GUIDELINES COMPLETE	/ /		12/31/84
DATA LINK DEVELOPMENT STUDIES START	01/31/84	04/30/88	
DATA LINK DEVELOPMENT STUDIES COMPLETE	04/30/90		
SATELLITE COMMUNICATIONS DEV. STUDIES COMPL.	04/30/90		
REVIEW/IMPLEMENTATION OF SELECTED COMM SYS.	01/31/91		

STATUS: COST/BENEFIT ANALYSIS POINTS TO VHF COMMUNICATION AS THE MOST COST EFFECTIVE WAY TO PROVIDE THESE SERVICES. \*

REMARKS/NOTES: THIS EFFORT SUPPORTS ACTIVITIES IDENTIFIED IN RESUMES ATO-82-011-M, ATO-82-012-M, ATO-82-013-M, ATO-83-014-M, AND ATO-82-016-M.

# AVS RESUME

ADL-82-050-M

PROJECT TITLE: ROTORCRAFT TRAFFIC-ALERT AND COLLISION AVOIDANCE  
SYSTEM (TCAS)  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN DEVELOPMENT AND LOGISTICS PROGRAMS

RESUME DATE: 03/18/87 LAST REVISION: 09/10/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: WALSH, JOSEPH, APM-330, (202) 267-8464  
TEAM LEADER : SMITH, R APM-450 (202) 267-3783  
WRITER/EDITOR :

OBJECTIVE: TO TAILOR THE TCAS LOGIC AND SURVEILLANCE TECHNIQUES TO MEET THE SPECIFIC REQUIREMENTS OF ROTORCRAFT. INCLUDES ALL ACTIVITIES NECESSARY TO DEFINE REQUIREMENTS FOR ROTORCRAFT USE OF TCAS, AND INVOLVES ANALYTICAL STUDIES, FLIGHT TESTS, AND RECOMMENDED CHANGES TO STANDARDS.

REQUIREMENT: UNIQUE NATURE OF ROTORCRAFT AND MANEUVERABILITY CHARACTERISTICS REQUIRES EVALUATION AND DEVELOPMENT OF SPECIAL TCAS PROVISIONS. REMOTE/LOW ALTITUDE OPERATIONS AND HIGH PROPORTION OF TIME SPENT IN VFR MAKES TCAS AN IMPORTANT ELEMENT OF SAFER ROTORCRAFT OPERATIONS IN VFR AND IFR.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
OPERATORS/USERS SURVEY	/ /		08/31/85
SURVEILLANCE STUDIES COMPLETE	11/30/83	12/31/86	12/31/86
LOGIC STUDIES COMPLETE	02/28/84	12/31/86	12/31/86
FLIGHT TESTS START	/ /		04/30/84
FLIGHT TESTS COMPLETE	11/30/84	01/31/86	12/31/86
REPORTS COMPLETE (DRAFT)	02/28/85	12/30/87	*
TCAS-I MOPS (FINAL DRAFT)	12/31/86		12/31/86*
RTCA MOPS APPROVED	/ /		03/20/87

STATUS: WITH THE PUBLICATION OF SEVERAL DRAFT REPORTS, WORK UNDER THIS RESUME WILL BE COMPLETE.

REMARKS/NOTES: IMPLEMENTATION DEPENDS ON USER PARTICIPATION AND EQUIPPAGE, SINCE FAA DOES NOT PLAN TO REQUIRE TCAS I EQUIPPAGE.

PROJECT TITLE: ROTORCRAFT LOW ALTITUDE SURVEILLANCE  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN DEVELOPMENT AND LOGISTICS PROGRAMS

RESUME DATE: 03/18/87 LAST REVISION: 09/10/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: GOURNIC, JOHN, APM-210, (202) 267-8337  
TEAM LEADER : SMITH, R APM-450 (202) 267-3783  
WRITER/EDITOR :

OBJECTIVE: TO PROVIDE FOR LOW ALTITUDE AIRCRAFT TRACKING, BELOW OR BEYOND RADAR COVERAGE, DEVELOPMENT OF A BASIC CONCEPT TO TRACK AIRCRAFT AT LOW ALTITUDES/REMOTE AREAS WITHOUT RADAR, USING INSTEAD NAVIGATION-BASED POSITION SENT TO ATC VIA DATA LINK. INVOLVES COOPERATIVE DEVELOPMENT, AND INTEGRATION WITH THE CURRENT AND FUTURE NAS COMPUTER SYSTEM. SECOND, TO DEVELOP LOW COST MODE S-BASED INTERROGATORS FOR USE AS GAP FILLERS TO AUGMENT THE SECONDARY SURVEILLANCE NETWORK.

REQUIREMENT: RADAR IS SUBJECT TO LINE-OF-SIGHT LIMITATIONS. WITHOUT RADAR, ATC MUST BE CONDUCTED PROCEDURALLY (MANUALLY). CONTROLLER WORKLOAD IS SUBSTANTIALLY INCREASED WITHOUT SURVEILLANCE. SURVEILLANCE IS REQUIRED AT LOW ALTITUDES NATIONWIDE. IN MANY AREAS, COVERAGE IS REQUIRED VIRTUALLY DOWN TO THE GROUND.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
LEASING PERIOD STARTS-NEW CONCEPT DEMO SYS.	/ /		02/28/84
CONTRACT AWARD FOR INTEGRATED SYSTEM	/ /		03/31/84
INSTALLATION AT HOUSTON-INTEGRATED SYSTEM	11/30/85	05/31/86	02/28/87
ACCEPTANCE/OPERATION OF INTEGRATED SYS.	02/28/86	06/30/87	04/30/87*
LOFF ACCURACY TESTING START	05/31/86	09/30/87	09/09/87*

STATUS: NO STATUS WAS PROVIDED.

REMARKS/NOTES: NAR TASK GROUP 1-3 CONCLUDED THAT RANDOM ROUTING SHOULD NOT BE IMPLEMENTED WITHOUT AIRCRAFT SURVEILLANCE. LOW ALTITUDE, SHORT-HAUL USERS HOWEVER, WOULD BE THE GREATEST BENEFICIARIES OF RANDOM ROUTING. NAR TASK GROUPS 2-4 CONCLUDED THAT SUCH NONRADAR TECHNIQUES FOR TRACKING LOW ALTITUDE AIRCRAFT SHOULD BE INTEGRATED INTO THE EXISTING NAS ENROUTE SYSTEM, EVEN PRIOR TO THE ARRIVAL OF THE ADVANCED AUTOMATION SYSTEM. URBAN AREAS WITH HIGH LEVEL TRANSPONDER EQUIPPAGE DICTATE NEED FOR MODE S-BASED SUPPLEMENT TO THE RADAR SYSTEM. DEVELOPMENT AND DEMONSTRATIONS ARE BASED ON COOPERATIVE INDUSTRY/FAA EFFORT AND COMMITMENT. THIS EFFORT SUPPORTS ACTIVITIES IDENTIFIED IN RESUMES ATO-82-011-M, ATO-82-012-M, ATO-82-013-M, ATO-82-014-M, AND ATO-82-016-M.

# AVS RESUME

ADL-82-070-X

PROJECT TITLE: ROTORCRAFT NAVIGATION/LANDING  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN DEVELOPMENT AND LOGISTICS PROGRAMS

RESUME DATE: 03/18/87 LAST REVISION: 09/10/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: BILLMANN, BARRY, ACT-140, (609) 484-6008  
TEAM LEADER : WEISS, R APM-450 (609) 267-8535  
WRITER/EDITOR :

OBJECTIVE: DEVELOP NEW ROTORCRAFT NAVIGATION AND LANDING CAPABILITIES FOR LOW ALTITUDE/REMOTE AREA OPERATIONS AND PROVIDE FOR CERTIFICATION OF NEW NAVIGATION/LANDING SYSTEMS. ALL ACTIVITIES TO PROVIDE FOR GREATER ROTORCRAFT NAVIGATION AND LANDING CAPABILITIES AND FOR THE CERTIFICATION OF SUCH SYSTEMS. EQUIPMENT/SYSTEM DEVELOPMENT, FLIGHT TEST, DEVELOPMENT OF SYSTEMS CERTIFICATION TOOLS AND TECHNIQUES.

REQUIREMENT: HELICOPTERS OPERATE AT LOW ALTITUDE WHERE VOR/DME OFTEN IS NOT AVAILABLE. LOW ALTITUDE NAVIGATION COVERAGE IS REQUIRED NATIONWIDE AT ALTITUDES DOWN TO THE GROUND. LOW TRAFFIC DENSITIES DICTATE NEED FOR ELIMINATION OF COSTLY GROUND EQUIPMENT. HELIPORT MLS NEEDED AT HIGHER DENSITY AREAS. ADVANCED SYSTEMS DISPLAYS SHOULD RESULT IN APPROVAL OF GREATER PRIVILEGES; HOWEVER, CERTIFICATION CRITERIA ARE NEEDED.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
ZERO/ZERO LANDING ISSUES-CONTRACT AWARD	01/31/87		08/30/86
ZERO/ZERO LANDING ISSUE DEFINED	02/28/88		
LORAN-C NONPRECISION APPROACH (PILOT PROJECT)	10/31/87		
LORAN-C 1ST PRODUCTION MONITOR INSTALLED	06/30/88		
LORAN-C MID-CONTINENTAL TRANSMITTERS INST.	01/31/89	12/31/89	
BASIC MLS FOR HELIPORTS START	/ /		09/30/83
BASIC MLS FOR HELIPORTS COMPLETE	12/31/86		12/31/86*

STATUS: WORK ON GPS HAS BEEN DELAYED DUE TO A LACK OF FUNDING.

REMARKS/NOTES: COOPERATIVE EFFORTS WITH OTHER GOVERNMENT AGENCIES. MLS IS REQUIRED FOR FAA TECHNICAL CENTER. THIS EFFORT SUPPORTS ACTIVITIES IDENTIFIED IN RESUMES ATO-82-011-M, ATO-82-012-M, ATO-82-013-M, ATO-82-014-M, AND ATO-82-016-M.



# AVS RESUME

ADL-82-080-M

PROJECT TITLE: HELIPORT PLANNING AND DESIGN CRITERIA  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN DEVELOPMENT AND LOGISTICS PROGRAMS

RESUME DATE: 03/18/87 LAST REVISION: 09/10/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: BILLMANN, BARRY, ACT-140, (609) 484-6608  
TEAM LEADER : SMITH, R APM-450 (202) 267-3783  
WRITER/EDITOR :

OBJECTIVE: DEVELOP CRITERIA FOR HELIPORT DESIGN STANDARDS AND DATA TO SUPPORT PREPARATION OF HELIPORT PLANNING GUIDE. INCLUDES ALL ACTIVITIES, WITH THE EXCEPTION OF NOISE, REQUIRED TO DEVELOP TECHNICAL INFORMATION ULTIMATELY APPEARING IN DESIGN AND PLANNING GUIDES. CONDUCT ENGINEERING STUDIES AND FLIGHT TESTS TO DEVELOP AND VALIDATE CRITERIA TO PROVIDE RESULTS TO THE OFFICE OF AIRPORTS FOR INPUT TO GUIDES, AND TO THE OFFICE OF AVIATION STANDARDS FOR PREPARATION OF STANDARDS AND PROCEDURES.

REQUIREMENT: THE EXISTING HELIPORT DESIGN GUIDE REQUIRES REFINEMENT AND ADDITIONAL INFORMATION CONCERNING ALL-WEATHER DESIGN. ALSO, NO HELIPORT PLANNING GUIDE EXISTS TODAY. HELIPORT GROWTH WILL BE A KEY TO CONTINUED INDUSTRY GROWTH. OF 4,000 HELIPORTS TODAY, LESS THAN 10% ARE PUBLIC USE AND NONE POSSESS A TRUE ALL-WEATHER CAPABILITY.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
START ALL-WX HELIPORT DESIGN INFO. PREP.	/ /		08/31/83
LOAD DEFINITION ANALYSIS COMPLETE	/ /		09/30/84
OTHER ALL-WX HELIPORT REQUIREMENTS	/ /	12/31/85	12/31/85
PRELIMINARY IFR LIGHTING RECOMMENDATION	/ /		06/30/84
SIMUL. TESTS OF HELIP. APPROACH LIGHT SYSTEMS	/ /		10/30/86
HELIPORT MANEUVERING AREA REPORT	09/30/88		*
HELIPORT/HELICOPTER CLASSIFICATION RECS.	12/30/88		*
HELIPORT PLANNING RECOMMENDATIONS	12/30/88		*
VFR APPROACH AND DEPARTURE AIRSPACE REPORT	10/30/89		*

STATUS: NONE.

REMARKS/NOTES: FAA CRITERIA, STANDARDS, AND GUIDELINES WILL BE ESTABLISHED FOR ALL-WEATHER HELIPORTS. HOWEVER, THE INDUSTRY MUST CONTINUE TO WORK WITH THE COMMUNITIES IN ORDER TO ACHIEVE GREATER PUBLIC ACCEPTANCE OF HELIPORTS AND HELICOPTER OPERATIONS. THIS EFFORT SUPPORTS ACTIVITIES IDENTIFIED IN RESUMES ARP-82-010-M, ARP-82-020-M, AND ARP-83-030-M.

PROJECT TITLE: ROTORCRAFT AIRWORTHINESS AND FLYING QUALITIES  
 PROJECT CATEGORY: ROTORCRAFT MASTER PLAN DEVELOPMENT AND LOGISTICS PROGRAMS

RESUME DATE: 03/18/87 LAST REVISION: 09/10/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: TRAYBAP, JOSEPH, (ACT-330), (609) 484-4280  
 TEAM LEADER : CAIAFA, C ACT-330 (609) 484-4284  
 WRITER/EDITOR :

OBJECTIVE: CONDUCT FLIGHT TEST TYPE ANALYSES AND DEVELOP PERTINENT DATA AND INFORMATION RELATED TO FLYING QUALITIES ASSESSMENT/AIRWORTHINESS EVALUATIONS/TESTING GUIDELINES REQUIRED TO SUPPORT CERTIFICATION PERSONNEL IN THEIR ASSESSMENT PROCEDURES AND SAFETY COMPLIANCE ASSURANCE OF ADVANCED ROTORCRAFT AND SYSTEMS. PARTICIPATE IN THE EXISTING JOINT AGREEMENT FLIGHT-TEST PROGRAM (BETWEEN THE FAA AND THE NATIONAL RESEARCH COUNCIL CANADA, NRC) THAT FOCUSES ON GROUND/IN-FLIGHT HELICOPTER STUDIES NEEDED TO ACCOMPLISH THE COORDINATED MUTUAL INTERESTS AND GOALS OF BOTH COUNTRIES. THE WORK CONCENTRATES ON IMPROVING AND UPDATING FLIGHT-TEST GUIDANCE MATERIAL AND TESTING PROCEDURES RELATED TO INCREASING THE OVERALL UTILITY AND COST EFFECTIVENESS OF THE ROTORCRAFT FLEET AND EXTENDING THAT PORTION OF THE AIRCRAFT FLIGHT ENVELOPE AVAILABLE FOR HIGH PERFORMANCE INSTRUMENT APPROACHES TO HELIPORTS.

REQUIREMENT: PROVIDE DATA AND INFORMATION THAT IMPROVES THE TESTING AND ASSESSMENT OF ROTORCRAFT AND PROVIDES SUPPORT TO THE TEST PILOTS, AIRWORTHINESS SPECIALISTS, AND REGULATORY PERSONNEL EVALUATING ADVANCED ROTORCRAFT FLIGHT CONTROL AND PERTINENT NEW TECHNOLOGY APPLICATIONS. THE INCREASING USE OF ROTORCRAFT FOR SPECIALIZED MISSIONS AND HIGHER PERFORMANCE INSTRUMENT OPERATIONS AT HELIPORTS PLACED CRITICAL DEMANDS ON THE\*

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
DEVELOPED PRIORITIZED TEST PLAN (ASW/ACT)	04/30/87		04/30/87
COUPLED/CROSSWIND COLLECTIVE TESTS PHASE I	09/30/87		*
COUPLED/CROSSWIND COLLECTIVE TESTS PHASE II	06/30/88		*
REPORT	12/30/88		*
DECELERATING APPROACH TESTS PHASE I	06/30/89		*
DECELERATING APPROACH TESTS PHASE II	10/30/89		*
REPORT	03/31/90		*
INTER-AXIS COUPLING TESTS PHASE I	06/30/90		*
INTX -AXIS COUPLING TESTS PHASE II	10/30/90		
REPORT	03/31/91		

STATUS: PROGRAM PRIORITIES COORDINATED BETWEEN ACT-330 AND PARTICIPATING ASW/ANE PERSONNEL. ALL MANAGEMENT/FINANCIAL DOCUMENTS BETWEEN FAA/NRC UPDATED AS NEEDED FOR NEW FOLLOW-ON ANNEX PHASE OF PROGRAM.

REMARKS/NOTES: THIS EFFORT SUPPORTS ACTIVITIES IDENTIFIED IN RESUMES AVS-85-202-M AND AVS-85-203-M.

\*AIRCRAFT/AIRCREW SYSTEM WHEREBY ADVANCED CONTROLS/DISPLAYS/SYSTEMS PLAY AN INCREASING ROLE ON IMPROVING PILOT WORKLOAD LEVEL WHILE AUGMENTING OVERALL SYSTEM SAFETY AND COST EFFECTIVENESS.

# AVS RESUME

ADL-82-100-M

PROJECT TITLE: ROTORCRAFT ICING  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN DEVELOPMENT AND LOGISTICS PROGRAMS

RESUME DATE: 03/19/87 LAST REVISION: 05/26/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: MASTERS, CHARLES, ACT-340, (609) 484-4147 \*  
TEAM LEADER : REED, J ACT-340 (609) 484-4135  
WRITER/EDITOR :

OBJECTIVE: DEFINE THE FLIGHT HAZARDS ASSOCIATED WITH ENVIRONMENTAL ICING. ESTABLISH A DATA BASE DELINEATING SPECIFICATIONS AND CRITERIA WHICH CAN BE USED BY THE AIRWORTHINESS SPECIALISTS DURING THE CERTIFICATION PROCESS. DEVELOP SCALING LAWS, AND SIMULATION AND ANALYTICAL TECHNIQUES WHICH CAN BE USED DURING THE CERTIFICATION PROCESS.

REQUIREMENT: EXPANDED ROTORCRAFT IMC OPERATIONS INCREASE THE POTENTIAL FOR FLIGHT INTO KNOWN ICING CONDITIONS. CERTIFICATION AUTHORITIES AND HELICOPTER MANUFACTURERS NEED NEW/REVISED ATMOSPHERIC ICING CRITERIA AND GUIDELINES WHICH INCLUDE ANALYTICAL AND SIMULATION TECHNIQUES AND VALIDATION TESTING IN CERTIFICATION.

MILESTONE SCHEDULE	COMPLETION DATES:	SCHED.	REVISED	ACTUAL
ATMOSPHERIC CHARAC. OF SUPERCOOLED CLOUDS		12/31/88	12/31/89	
ATMOSPHERIC CHARAC. OF SNOW, FREEZING RAIN		12/31/88	12/31/89	
ATMOS. CHARAC. OF ICE CYRSTALS, MIXED COND.		12/31/90	12/31/89	
AIRCRAFT ICING HANDBOOK		06/30/87	03/30/88	
SIMULATION IN CERTIFICATION (RATIONALE)		03/31/86		03/31/86
ICING INSTRUMENTATION CALIBRATION STDS.		10/31/88		
DEV. DATE FOR SNOW SIMULATION AC		/ /		05/31/84
GROUND DEICING TECHNOLOGY		12/31/85	04/30/86	03/31/86

STATUS: ATMOSPHERIC CHARACTERIZATIONS OF SUPERCOOLED FOG ARE IN THE PLANNING STAGES.

REMARKS/NOTES: THIS EFFORT SUPPORTS ACTIVITIES OUTLINED IN RESUME  
AVS-81-150-M.

PROJECT TITLE: ROTORCRAFT CRASHWORTHINESS/STRUCTURAL AIRWORTHINESS  
 PROJECT CATEGORY: ROTORCRAFT MASTER PLAN DEVELOPMENT AND LOGISTICS PROGRAMS

RESUME DATE: 03/19/87 LAST REVISION: 05/26/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: NERI, LAWRENCE, ACT-330, (609) 484-4459 \*  
 TEAM LEADER : CAIAFA, C ACT-330 (609) 484-4284  
 WRITER/EDITOR :

OBJECTIVE: TO ENHANCE OCCUPANT SURVIVABILITY THROUGH STRUCTURAL AND CABIN DESIGN, AND FUEL SYSTEM INTEGRITY. DEFINE SURVIVABLE CRASH ENVIRONMENT, DEVELOP/EVALUATE AIRFRAME CONCEPTS, DEVELOP CABIN SAFETY CONCEPTS, EVALUATE/VALIDATE CRASH RESISTANT FUEL SYSTEMS, AND DEVELOP/VALIDATE EMERGENCY EGRESS CONCEPTS. CONDUCT THE APPROPRIATE RESEARCH IN SUPPORT OF INDICATED GOALS. DETERMINE OPTIONAL MIX OF CRASHWORTHINESS MEASURES FOR CONSIDERATION IN IMPROVEMENTS TO AIRCRAFT CERTIFICATION CRITERIA. \*

REQUIREMENT: ROTORCRAFT MANUFACTURERS AND CERTIFICATION AUTHORITIES NEED IMPROVED CRITERIA AND STANDARDS ADDRESSING CRASHWORTHY DESIGN FEATURES IN AN EFFORT TO MAXIMIZE OCCUPANCY AND CREW SURVIVABILITY IN THE EVENT OF A CRASH.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
CRASH ENVIRONMENT DEFINITION	/ /		09/30/83
COMPOSITE AIRFRAME IMPACT DYNAMICS	09/30/87		
AIRFRAME CONCEPTS	07/31/85	08/31/88	
CABIN SAFETY	12/31/85	02/28/88	
FUEL CONTAINMENT	06/30/86	03/31/88	
EMERGENCY EGRESS	12/31/86	05/31/88	
SYSTEM ECONOMIC ANALYSIS	12/31/87		

STATUS: EFFORTS ARE ONGOING TO INVESTIGATE ROTORCRAFT CRASHWORTHY AIRFRAME CONCEPTS AND TO PRESCRIBE HOW EXISTING FUEL CONTAINMENT TECHNOLOGY MAY BE DIRECTLY TRANSFERRED FROM THE MILITARY TO THE CIVIL FLEET IN A COST-EFFECTIVE MANNER. \*

REMARKS/NOTES: THE ROTORCRAFT CRASHWORTHINESS PROGRAM IS A GENERIC CRASHWORTHINESS PROGRAM IN CONCERT WITH NASA, AND U.S. NAVY. USES INTERAGENCY AGREEMENTS, COMPETITIVE CONTRACTS, AND IN-HOUSE RESOURCES TO THE GREATEST EXTENT PRACTICAL. THE INCREASED USE OF ADVANCED TECHNOLOGY MATERIALS IN AIRFRAME STRUCTURE HAS DICTATED CERTIFICATION STANDARDS TO BE REVISITED. \*

# AVS RESUME

ADL-83-120-M

PROJECT TITLE: ROTORCRAFT OBSTRUCTION AVOIDANCE  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN DEVELOPMENT AND LOGISTICS PROGRAMS

RESUME DATE: 03/19/87 LAST REVISION: 09/10/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: TRAYBAR, JOSEPH, ACT-330, (609) 484-4286  
TEAM LEADER : SMITH, R APM-450 (202) 267-3783  
WRITER/EDITOR :

OBJECTIVE: ENHANCE SAFETY OF LOW ALTITUDE OPERATIONS THROUGH A COMPREHENSIVE SYSTEMS APPROACH TO OBSTRUCTION AVOIDANCE. EMPHASIS WILL BE PLACED ON THE EVALUATION AND IMPROVEMENT OF OPERATIONAL PROCEDURES, OBSTRUCTION MARKING/LIGHTING TECHNIQUES, OBSTRUCTION DETECTION SYSTEMS, AND OBSTRUCTION PROTECTION SYSTEMS.--AIR AMBULANCE HELICOPTER OPERATIONS ARE OF PARTICULAR INTEREST. \*

REQUIREMENT: COLLISIONS WITH OBSTRUCTIONS, PARTICULARLY WIRES, ARE RESPONSIBLE FOR A SIGNIFICANT NUMBER OF LOW ALTITUDE INJURIES AND FATALITIES EACH YEAR. A NUMBER OF MEASURES CAN BE TAKEN AGAINST THESE HAZARDS TO IMPROVE THE SAFETY OF LOW ALTITUDE OPERATIONS. SUPPORT GUIDANCE MATERIAL/CERTIFICATION PROCEDURES FOR AIRBORNE EQUIPMENT IS REQUIRED.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
OBSTRUCTION AVOIDANCE ACCIDENT/INCIDENT ANAL.	10/31/84	03/31/87	09/30/86
DEVELOP A DRAFT PROJECT PLAN	06/30/87		06/30/87*
PHASE I, ANALYSIS	03/31/88	10/30/89	
PHASE II, SIMULATION TESTING	02/28/91		
PHASE III, FLIGHT TESTING	03/30/92		

STATUS: THE SCOPE OF THIS PROJECT WILL BE REEVALUATED BASED ON AN FAA REVIEW OF THE DRAFT PROJECT PLAN. \*

REMARKS/NOTES: THIS EFFORT SUPPORTS ACTIVITIES IDENTIFIED IN RESUME ATO-82-051-X.

# AVS RESUME

ADL-85-130-X

PROJECT TITLE: ROTORCRAFT ATMOSPHERIC ELECTRICAL HAZARDS  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN DEVELOPMENT AND LOGISTICS PROGRAMS

RESUME DATE: 03/19/87 LAST REVISION: 09/10/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: REED, JOHN, ACT-340, (609) 484-4135  
TEAM LEADER :  
WRITER/EDITOR :

OBJECTIVE: THIS RESEARCH EFFORT WILL ESTABLISH THE LIGHTNING CHARACTERIZATION MODEL, LIGHTNING STRIKE ZONES, SIMULATION TECHNIQUES, ANALYTICAL MODELS, ALGORITHMS, AND DEFINE ACCEPTABLE CERTIFICATION STANDARDS. CERTIFICATION VALIDATION PROCESS ACCEPTABLE USING BOTH ANALYTICAL AND SIMULATION TECHNIQUES WILL BE ESTABLISHED.

REQUIREMENT: THE IMPACT OF ELECTRICAL HAZARDS SUCH AS LIGHTNING, STATIC DISCHARGE PHENOMENON, ELECTRICAL DISCHARGE, AND AIRCRAFT GENERATED ELECTROMAGNETIC INTERFERENCE (EMI) ON COMPOSITE HELICOPTER STRUCTURES AND SYSTEMS USING DIGITAL ELECTRONICS, PRESENTS SAFETY ISSUES WHICH MUST BE ADDRESSED.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
LIGHTNING HAZARD MODEL AND STRIKE ZONE	06/30/88	10/30/88	
COMPOSITE/ELECTRICAL PROPERTIES	02/28/86	07/30/87	07/30/87*
LIGHTNING PROTECTION HANDBOOK	09/30/87	12/30/87	
LIGHTNING SIMULATION TECHNIQUES	08/31/87	10/30/87	
SOFTWARE RELIABILITY ASSESSMENT	01/31/89		12/17/86
LATENT FAULT MEASUREMENTS	02/28/86		12/30/86
BUS INTEGRITY	04/30/86		03/30/87
DIGITAL SYSTEMS VALIDATION HANDBOOK	04/30/88	06/30/89	

STATUS: THE ATMOSPHERIC ELECTRICAL HAZARDS ARE GENERIC, THEREFORE, THIS PROGRAM CAPITALIZES ON PAST, ONGOING, AND FUTURE RESEARCH AND IN AN EFFORT TO COALESCE RESOURCES, PARTICIPATION AS AN ACTIVE MEMBER OF THE NATIONAL INTERAGENCY COORDINATION GROUP FOR LIGHTNING PROTECTION OF AIRCRAFT.

REMARKS/NOTES: ELECTROMAGNETICALLY, THE ROTORCRAFT IS A VERY COMPLEX VEHICLE AND DOES NOT EASILY LEND ITSELF TO PREDICTIONS OF INDUCED ELECTRICAL EFFECTS.

# AVS RESUME

ADL-85-140-X

PROJECT TITLE: SIMULATOR VALIDATION  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN DEVELOPMENT AND LOGISTICS PROGRAMS

RESUME DATE: 03/19/87 LAST REVISION: 09/10/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: BOOTHE, EDWARD, ASO-205, (404) 763-7773  
TEAM LEADER : WEISS, R APM-450 (202) 267-8535 \*  
WRITER/EDITOR :

OBJECTIVE: THIS PROJECT WILL ESTABLISH THE NECESSARY CRITERIA AND GUIDANCE MATERIAL TO PERMIT FAA CERTIFICATION OF HELICOPTER SIMULATORS WHICH CAN BE USED FOR HELICOPTER PILOT CERTIFICATES AND ASSOCIATED TYPE RATINGS.

REQUIREMENT: THE AGENCY DOES NOT RECOGNIZE HELICOPTER SIMULATORS AS A SUBSTITUTE FOR THE AIRCRAFT IN CONDUCTING AIRMAN CERTIFICATION. IN ORDER FOR THE FAA TO GIVE PILOT TRAINING AND CHECKING CREDITS FOR TIME IN A HELICOPTER SIMULATOR, THE SIMULATOR MUST BE FAA-VALIDATED TO A MINIMUM ACCEPTABLE PERFORMANCE CRITERIA.

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
VISUAL SCENE PERFORMANCE	09/30/87	03/30/89	
MOTION SYSTEM PERFORMANCE	06/30/86	03/30/89	
MODELS AND ALGORITHMS	09/30/87	03/30/89	

STATUS: THIS PROJECT WAS DELAYED DUE TO A LACK OF FUNDING.

REMARKS/NOTES: THIS EFFORT SUPPORTS ACTIVITIES OUTLINED IN RESUMES AVS-83-050-X AND AVS-83-051-X. THIS PROJECT WILL BE ACCOMPLISHED AT NASA-AMES.

PROJECT TITLE: ROTORCRAFT HUMAN BEHAVIOR  
PROJECT CATEGORY: ROTORCRAFT MASTER PLAN DEVELOPMENT AND LOGISTICS PROGRAMS

RESUME DATE: 03/19/87 LAST REVISION: 09/11/87 REACTIVATED:

STAFF: PRINCIPAL SPECIALIST: HWOSCHINSKY, PETER, APM-450, (202) 267-8531  
TEAM LEADER : WEISS, R APM-450 (202) 267-8535  
WRITER/EDITOR :

OBJECTIVE: TO ESTABLISH A DATA BASE FOR ASSESSING AND STANDARDIZING ROTORCRAFT DISPLAYS AND CONTROLS. THIS INFORMATION WILL ESTABLISH THE RELATIONSHIP BETWEEN FATIGUE, STRESS, AND ROTORCRAFT COCKPIT DESIGN, (VISIBILITY REQUIREMENTS WILL BE INCLUDED). IN ADDITION, AERONAUTICAL DECISIONMAKING (ADM) CONCEPTS WHICH HAVE BEEN DEVELOPED AND APPLIED TO FIXED-WING TRAINING SHALL BE MODIFIED FOR APPLICATION TO ROTORCRAFT TRAINING IN AN EFFORT TO REDUCE THE NUMBER OF PILOT-ERROR ACCIDENTS.

REQUIREMENT: THE USE OF ROTORCRAFT HAS CHANGED DRASTICALLY IN SPECIFIC AREAS AND THE AGENCY HAS A PRESSING NEED TO ESTABLISH ACCEPTABLE STANDARDS FOR DISPLAY CONTROLS AND CREW DUTY TIME. ALSO, ROTORCRAFT DECISIONMAKING TRAINING MUST BE ESTABLISHED AND DOCUMENTED (PARITY WITH FIXED-WING AIRCRAFT).

MILESTONE SCHEDULE	COMPLETION DATES: SCHED.	REVISED	ACTUAL
ADM. MANUAL FOR ROTORCRAFT PILOTS	08/31/86		03/31/87
ADM. MAN. FOR AIR AMBULANCE ROTORCRAFT PILOTS	08/30/88		*
ROTORCRAFT DISPLAY AND CONTROL STANDARD	12/31/83		
PILOT VISIBILITY CRITERIA	12/31/83		
ROTORCRAFT FATIGUE AND STRESS	03/31/89		

STATUS: THE PROGRAM REQUIREMENTS AND INVESTIGATIVE PROCESS HAVE BEEN DELINEATED AND INCORPORATED INTO AN AVIATION BEHAVIORAL TECHNOLOGY PROGRAM. COCKPIT HUMAN FACTORS RESEARCH PLAN.

REMARKS/NOTES: THIS EFFORT SUPPORTS ACTIVITIES IDENTIFIED IN RESUME AVS-83-141-M.